

SUPPLEMENTAL GROUNDWATER INVESTIGATION:
FOURTH GROUNDWATER SAMPLING EVENT

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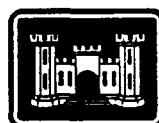
**NL/TARACORP
SUPERFUND SITE
GRANITE CITY, ILLINOIS**



Prepared for

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Region V
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**U.S. Department of the Army
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**Woodward-Clyde
Consultants**

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**SUPPLEMENTAL GROUNDWATER INVESTIGATION:
FOURTH GROUNDWATER SAMPLING EVENT
NL/TARACORP SUPERFUND SITE PREDESIGN FIELD INVESTIGATION**

1.0

INTRODUCTION

The Supplemental Groundwater Investigation for the NL/Taracorp Superfund Site (NL Site), in Madison County, Illinois, was conducted as part of Work Order No. 0014 of Woodward-Clyde (W-C) indefinite delivery contract with the United States Army Corps of Engineers, Omaha District (USACE) (Contract No. DACW45-93-D-0005).

The objective of the fourth groundwater sampling event was to provide additional information on groundwater quality for the NL Site. The groundwater investigation consisted of sampling monitoring wells which had been previously sampled as part of the Pre-design Field Investigation (PDFI) and to sample monitoring wells which had been dry in previous sampling events. The groundwater samples were analyzed for the Target Analyte List metals. The analytical results and field observations for this sampling event are included in this report.

**2.0
FIELD ACTIVITIES**

2.1 SAMPLING PROCEDURES

The fourth groundwater sampling event was conducted by W-C personnel on September 15 through 20, 1993. Sixteen of the 18 monitoring wells were purged and sampled. The sampling procedure for thirteen of the sixteen monitoring wells consisted of purging and sampling using a submersible pump. This was the same sampling procedure as was used during the third sampling event at the request of USEPA. On the other three wells purging and sampling were completed using a bailer. The pump could not be lowered into well MW-107S due to a damaged well casing. For wells MW-101 and MW-108S, the monitoring wells had low water levels with slow recoveries and could not be pumped by the submersible pump.

Twelve of the wells which were sampled were constructed of two-inch I.D. PVC screens and risers and ranged from 20 to 35 feet in depth. The other four wells which were sampled were constructed of two-inch I.D. stainless steel screens and risers and were approximately 70 feet deep. Two of the existing wells, MW-103 and MW-105D, were bent and damaged, and could not be sampled. A well information summary for the September, 1993 sampling event is included in Table 1.

Prior to initiating any intrusive activities at a well site, the sampling team would don a polycoated Tyvek, latex undergloves, and neoprene outergloves. The well cover was unlocked or the flush-mount cover removed. The sampling team measured the water level and total depth of the well by using an electronic water level indicator. The indicator was decontaminated with deionized water as it was removed from the well casing. Conductivity and pH meters were calibrated with prepared standards before and after each sample was taken. All sampling equipment, including the stainless steel bailers were decontaminated prior to use. In accordance with CDAP SOP No. 6, the decontamination procedure consisted of a wash in Alconox soap, a tap water rinse, an alcohol rinse and a final deionized

water rinse. The submersible pump was also decontaminated in this manner before and after each use.

Due to a damaged well casing, well MW-107S could not be purged or sampled using the submersible pump. Instead, a one inch diameter stainless steel bailer was used to purge and sample the well. A new length of clean nylon rope was attached to the bailer. After five well volumes were removed, the appropriate sample jars were filled for metals analysis. The protective well cover was closed and locked.

Wells MW-101 and MW-108S could not be purged or sampled with the submersible pump due to low water levels and slow recoveries. Instead, a two in. diameter stainless steel bailer was used to purge and sample the wells. A new length of clean nylon rope was attached to the bailer. After purging each well five well volumes, the appropriate sample jars were filled for metals analysis. The bailers were decontaminated in accordance with CDAP SOP No. 6. The protective well cover was closed and locked.

For the remaining thirteen wells that were sampled, a submersible pump was used instead of a bailer to purge the five well volumes. An electric generator was set up downwind from the well. A new length of nylon rope and Tygon tubing was attached to the pump assembly. This assembly was then lowered into the well after being connected to the pump power converter and generator. After the removal of the five well volumes, the pumping rate was reduced to approximately one liter/minute and the appropriate sample containers were filled. (The slowest the submersible pump could deliver a steady stream of water to the surface was approximately one liter/minute.) After the sampling was completed, the Tygon tubing, pump, and pump cable were removed from the well and decontaminated. The pump was placed in buckets containing Alconox soap, a tap water rinse, an alcohol rinse and a final deionized water rinse. Each of the decontamination solutions was run through the pump and all of the Tygon tubing prior to use at the next well. All purge water was placed in a 100 gallon wastewater tank to be disposed of on the Taracorp pile. The used rope and used PPE equipment were put into plastic trash bags for proper disposal.

If required, bottles for QA/QC were also filled. A separate jar was filled to measure field parameters (pH, conductivity, temperature, and water clarity). The sample jars were

decontaminated, dried, and labeled as specified in CDAP SOP No. 3. Samples were then packed in iced coolers to be maintained at a temperature of 4 °C. Field sampling sheets were completed for each sample. Information on sampling sheets included the time of sampling, sampling team members initials, and required analysis.

At the end of each day of sampling, chain-of-custody forms were completed and the sample jars packed in iced coolers for shipment to Environmetrics Laboratory in St. Louis, Missouri. QA samples collected each day were packed in iced coolers and shipped to the USACE-MRD, via Federal Express priority overnight delivery.

2.2 LABORATORY METHODOLOGY AND QUALITY CONTROL

Groundwater samples collected from the NL Site were analyzed for the Target Analyte List (TAL) Metals. Samples were analyzed in accordance with the PDFI CDAP and EPA SW-846 procedures and protocols. Groundwater and QC sample analyses were conducted by Environmetrics Laboratory in St. Louis, Missouri, in accordance with the appropriate SOPs and the laboratory's QAPP. QA sample analyses were conducted at the USACE-MRD Laboratory.

The quality control level of effort for the groundwater investigation consisted of collecting and submitting to Environmetrics these samples:

- 2 Field duplicates
- 1 MS/MSD per batch (3 MS/MSDs were performed by Environmetrics)
- 1 Equipment rinsate blank

The quality assurance level of effort for the groundwater investigation consisted of collecting and submitting to USACE these samples:

- 2 Field duplicates
- 1 MS/MSD
- 1 Equipment rinsate blank

The quality control and quality assurance levels of effort are summarized in Table 2.

The analytical method specific Data Quality Objectives (DQO's) for groundwater samples collected from the NL Site included precision, accuracy, and sensitivity criteria. The QA objective was to achieve the QC acceptance criteria required by the analytical protocols in SW-846. The initial validation of laboratory data was performed by Environmetrics. W-C conducted an independent validation of the laboratory data packages. A summary of data validation results is presented with the attached analytical data in the Appendix.

Corrective action was applied when any measurement system failed to follow the laboratory QAPP or CDAP Data Quality Objectives. The laboratory QA Supervisor reviewed the data generated to verify that all quality control samples were within the established control limits. Data generated with laboratory control samples that did not fall within control limits were considered suspect, and the sample analysis was repeated or samples results were reported with qualifiers if reanalysis was not possible.

Analytical data that was generated which fell within acceptable control limits were judged to be in control. Data generated which fell outside control limits are considered suspect and are reported with qualifiers. Data for all samples appear usable with no qualification necessary.

3.0

FIELD OBSERVATIONS

The average groundwater level rose approximately two foot since the previous sampling event which was conducted in March, 1993. The rise in the groundwater level is attributed to the above normal rainfall in the area during the spring and summer months. The higher groundwater levels allowed four shallow monitoring wells (average depth of 20 to 25 feet) to be sampled for the first time since prior to the start of the PDFI.

The water clarity in majority of the monitoring wells was generally clear. For seven of the monitoring wells, MW-101, MW-102, MW-104, MW-106S, MW-107S, MW-107D, and MW-108S, the water appeared to be slightly cloudy to very cloudy and brown in color with trace of fine sand. The poor water clarity and the sampling problems were probably due to the seven wells' low water levels and slow recoveries.

The pH measurements for the wells showed values ranging from 5.9 to 7.4. Groundwater temperatures ranged from 15 to 20°C. Conductivities generally ranged from 990 to 1930 $\mu\text{mhos}/\text{cm}$, except for MW-104 and MW-108D. MW-104 had a significantly lower conductivity of 320 $\mu\text{mhos}/\text{cm}$, while MW-108D had a high conductivity of 3510 $\mu\text{mhos}/\text{cm}$. These field parameters were very similar to the parameters measured during the previous sampling events. A summary of field parameters measured during the sampling event is provided in Table 3.

4.0

ANALYTICAL RESULTS - METALS

Groundwater samples were analyzed for 13 metals of concern which included lead, arsenic, cadmium, and chromium. The analytical results for this sampling event are included in Table 4 and historical results are included in Table 5. The laboratory data from this sampling event are included in the Appendix. Also included in Tables 4 and 5 are the maximum contaminant levels (MCL) for each constituent promulgated under the Safe Drinking Water Act and the Illinois Groundwater Quality Standards for Class I: Potable Resource Groundwater.

All metals except for antimony, beryllium, silver, and mercury were detected at concentration levels above reporting limits in at least one sample collected from the monitoring wells (Table 4). Samples from eight monitoring wells had lead concentrations greater than the MCL of 0.015 mg/L and the Illinois Class I groundwater lead standard of 0.0075 mg/L. The eight wells with their respective measured lead concentrations were:

<u>Monitoring Well</u>	<u>Lead Results (mg/L)</u>
MW-101	0.077
MW-102	0.136
MW-104	0.043
MW-104-92	0.520/0.480
MW-105S	0.015
MW-106S	0.143
MW-107S	0.047
MW-108S	1.020

The lead level of 0.520 mg/L measured in MW-104-92 was higher than previous results. Therefore, the sample was reanalyzed. The reanalysis yielded a result of 0.480 mg/L, a level still above the MCL and the Illinois Class I groundwater standard for lead.

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Four shallow monitoring wells, MW-102, MW105S, MW-106S, and MW-108S, were sampled for the first time during the PDFI due to higher groundwater levels monitored during this sampling event. The samples from these four wells had metal concentrations which were above either the respective MCLs or the respective Illinois Class I groundwater standards for several metals (Table 4). The groundwater sample from well MW-108S, located directly west of the Taracorp pile (Figure 1), had the highest lead concentration ever measured during the PDFI groundwater investigations. Other metals detected in well MW-108S were above either the respective MCLs or the respective Illinois Class I groundwater standards or both for arsenic, cadmium, chromium, lead, nickel and zinc. Wells MW-102 and MW-105S had lead concentrations above the respective MCL. Well MW-102 is located southeast of the industrial property, and MW-105S is located in the northwest corner of the Taracorp property (Figure 1). The sample from well MW-106S had metal concentrations above either the respective MCLs or the respective Illinois Class I groundwater standards or both for chromium, lead, and nickel.

Other wells sampled during the event which had metal concentrations that were above either the respective MCLs or the respective Illinois Class I groundwater standards or both were MW-101, MW-104, MW-104-92, MW-107S, and MW-108D (Table 4). Well MW-101 had metal concentrations above the respective MCLs and Illinois Class I standards for arsenic, cadmium, and lead. Both MW-104 and MW-104-92 wells had samples with metal concentrations above the respective MCLs and Illinois Class I standards for cadmium and lead. The sample from well MW-107S had lead concentrations above the respective MCL. The groundwater sample from well MW-108D had the highest cadmium and zinc concentrations of 4.51 mg/L and 18.1 mg/L, respectively. This cadmium concentration was above the MCL and the Illinois Class I standards. The zinc concentration measured in well MW-108D was above the Illinois Class I standard only since there is not a MCL for zinc. The nickel concentration measured in the sample from MW-108D was also above the respective MCL and Illinois Class I standard.

Monitoring wells located upgradient of the Taracorp pile, MW-110 and MW-111-92, did not detect any metals above the reporting limits. Quality control samples consisting of field duplicates were taken from MW-108D and MW-111-92. Constituent metal concentration levels for both duplicate samples were representative of the respective groundwater sample (Table 4). No metal concentrations were detected above the reporting limits for the rinsate sample, MW-112.

The analytical results from each well for this sampling event were fairly consistent with the previous sampling events (Table 5). The differences in sample concentrations from one sampling event to the other may depend on various parameters including (1) sampling methods, (2) water level fluctuations, (3) soil permeability, (4) soil heterogeneity, and (5) dispersion and adsorption properties of the surrounding soils.

Starting January 1, 1994, promulgated under the Safe Drinking Water Act, new MCLs will become effective for three metals of concern at the NL Site. The three metals and their respective MCLs are antimony at 0.006 mg/L, beryllium at 0.004 mg/L, and thallium at 0.002 mg/L.

TABLES

TABLE 1
WELL INFORMATION
Groundwater Sampling Event September, 1993
NL/Taracorp Superfund Site

WELL NUMBER	MEASURED TOTAL DEPTH (FEET)	WELL DIAM. (IN.)	SCREEN INTERVAL (FEET)	SCREEN MATERIAL	RISER ELEV. (MSL)	WATER LEVEL (FEET)	WATER ELEVATION (FEET)	WELL VOLUME (GALS.)	PURGE VOLUME (GALS.)
101	26.2	2	15-25	PVC	421.45	17.27	404.18	1.4	7.2
102	24.2	2	15-25	PVC	416.58	13.70	402.88	1.7	8.6
103	BENT RISER	2	15-25	PVC	417.17	NA	403.13	9.7	48.4
103-91		2	58.71-68.71	SS	416.89				
104	28.68	2	17-27	PVC	422.25	18.35	403.90	1.7	8.4
104-92	68.35	2	58.12-68.12	SS	418.25	15.02	403.23	8.7	43.5
105S	28.8	2	21-26	PVC	428.66	25.57	403.09	0.5	2.6
105D	BENT RISER	2	30.3-35.3	PVC	428.74	28.11	400.63	0.5	2.3
106S		2	15.79-20.79	PVC	423.71	20.68	403.03		
106D	37.43	2	29.91-34.91	PVC	423.79	20.63	403.16	2.7	13.7
107S	24.31	2	17.46-22.46	PVC	420.78	14.24	406.54	1.6	8.2
107D	38	2	30.44-35.44	PVC	421.65	18.61	403.04	3.2	15.8
108S	23.4	2	15.4-20.4	PVC	421.71	19.55	402.16	0.6	3.1
108D	33.65	2	27.26-32.26	PVC	422.71	18.75	403.96	2.4	12.2
109	32.67	2	29-34	PVC	416.64	12.37	404.27	3.3	16.6
109-92	69.1	2	59.26-69.26	SS	415.71	13.19	402.52	9.1	45.6
110	33.94	2	30-35	PVC	418.49	17.06	401.43	2.8	13.8
111-92	67.7	2	57.64-67.64	SS	419.40	17.57	401.83	8.2	40.9

TABLE 2
GROUNDWATER SAMPLING SUMMARY
September, 1993 Groundwater Sampling Event
NL/Taracorp Superfund Site

WELL NUMBER	FIELD SAMPLES	QUALITY ASSURANCE			QUALITY CONTROL		
		FIELD DUPLICATE	MS/MSD	RINSATE BLANKS	FIELD DUPLICATE	MS/MSD*	RINSATE BLANKS
101	1						
102	1						
103-91	1						
104	1	1					
104-92	1	1	1/1			1/1	
105S	1						
106S	1						
106D	1						
107S	1						
107D	1						
108S	1						
108D	1					1	
109	1						
109-92	1						
110	1					1/1	
111-92	1					1	
112							
113					1		1
Total Frequency (%)	16	2	1/1	1	2	3/3	1
		13	6/6	6	13	19/19	6

* Matrix Spike (MS)/ Matrix Spike Duplicate (MDS) samples were analyzed at a frequency of one sample per laboratory batch.

TABLE 3
FIELD PARAMETERS
September, 1993 Groundwater Sampling Event
NL/Taracorp Superfund Site

WELL ID	SAMPLING DATE	pH	CONDUCTIVITY ($\mu\text{mhos/cm}$)	TEMP. (°C)	WATER CLARITY
MW-101	17-Sep-93	7.40	1452	18.1	Lt. Gray w/ trace of sand fines
MW-102	20-Sep-93	5.89	1002	18.4	Very Cloudy; Brown
MW-103-91	17-Sep-93	6.88	1218	20.4	Clear
MW-104	20-Sep-93	6.30	320	19.5	Cloudy; Brown
MW-104-92	20-Sep-93	6.09	1185	18.1	Clear
MW-105S	16-Sep-93	6.84	1337	17.4	Semi-Clear
MW-106S	16-Sep-93	6.73	1523	18.6	Very Cloudy; Yellowish-brown
MW-106D	16-Sep-93	6.82	1040	17.2	Clear
MW-107S	16-Sep-93	6.95	990	16.9	Partially Cloudy w/ trace of sand fines
MW-107D	16-Sep-93	6.91	1186	17.4	Partially Cloudy
MW-108S	17-Sep-93	6.98	1930	19.6	Lt. Brown w/ trace of sand fines
MW-108D	17-Sep-93	7.19	351	20.1	Clear
MW-109	17-Sep-93	6.72	1146	18.6	Clear
MW-109-92	17-Sep-93	6.03	1176	17.6	Clear
MW-110	16-Sep-93	6.12	1038	15.4	Clear
MW-111-92	16-Sep-93	6.72	1267	17.2	Clear

NOTE: Water parameters were measured with a Corning Checkmate meter.

Table 4
Metals Results of September, 1993 Groundwater Sampling Event
NL/Taracorp Superfund Site

Parameter	Unit	MCLs (mg/L)	ILLINOIS CLASS I STANDARDS (mg/L)	MW-101	MW-102	MW-103-91	MW-104	MW-104-92	MW-105S
Antimony	mg/l	-	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Arsenic	mg/l	0.05	0.05	0.181 (3)	0.015	<0.010	0.018	<0.010	<0.010
Beryllium	mg/l	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Cadmium	mg/l	0.005	0.005	0.006 (3)	<0.005	<0.005	0.005 (3)	0.005 (3)	<0.005
Chromium	mg/l	0.1	0.1	0.047	0.027	<0.010	0.035	<0.010	0.029
Copper	mg/l	1.3*	0.65	0.063	0.028	<0.025	<0.025	<0.025	<0.025
Lead	mg/l	0.015*	0.0075	0.077 (3)	0.136 (3)	<0.003	0.043 (3)	0.520/0.480 (3)	0.015 (3)
Mercury	mg/l	0.002	0.002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Nickel	mg/l	0.1	0.1	0.072	0.062	<0.040	0.047	<0.040	<0.040
Selenium	mg/l	0.05	0.05	0.007	0.015	<0.005	<0.005	<0.005	0.016
Silver	mg/l	-	0.05	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Thallium	mg/l	-	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Zinc	mg/l	-	5.0	0.199	0.123	<0.020	0.072	0.037	0.039

- * - Action Level that triggers treatment
- (1) - Sample Concentration is above the MCL.
- (2) - Sample Concentration is above the Illinois Groundwater Quality Standard for Class I Potable Resource Groundwater.
- (3) - Sample Concentration is above both the MCL and the Illinois Class I Groundwater Quality Standard.

Table 4
Metals Results of September, 1993 Groundwater Sampling Event
NL/Taracorp Superfund Site

Parameter	Unit	MCLs (mg/L)	ILLINOIS CLASS I STANDARDS (mg/L)							MW-108D QC FIELD DUPLICATE
				MW-106S	MW-106D	MW-107S	MW-107D	MW-108S	MW-108D	
Antimony	mg/l	—	—	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Arsenic	mg/l	0.05	0.05	0.014	<0.010	<0.010	<0.010	0.109 (3)	<0.010	<0.010
Beryllium	mg/l	—	—	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Cadmium	mg/l	0.005	0.005	<0.005	<0.005	<0.005	<0.005	0.475 (3)	4.51 (3)	4.42 (3)
Chromium	mg/l	0.1	0.1	0.476 (3)	0.019	0.014	0.076	0.082	<0.010	<0.010
Copper	mg/l	1.3*	0.65	0.056	<0.025	<0.025	<0.025	0.092	<0.025	<0.025
Lead	mg/l	0.015*	0.0075	0.143 (3)	<0.083	0.047 (3)	<0.003	1.02 (3)	<0.003	<0.003
Mercury	mg/l	0.002	0.002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Nickel	mg/l	0.1	0.1	0.366 (3)	<0.040	<0.040	<0.040	0.254 (3)	0.313 (3)	0.302 (3)
Selenium	mg/l	0.05	0.05	0.011	0.013	0.011	<0.005	<0.005	<0.005	<0.005
Silver	mg/l	—	0.05	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Thallium	mg/l	—	—	<0.050	<0.050	<0.050	<0.050	0.07	<0.050	0.05
Zinc	mg/l	—	5.0	0.181	<0.020	0.084	0.05	0.567	18.1 (2)	17.9 (2)

* — Action Level that triggers treatment

(1) — Sample Concentration is above the MCL.

(2) — Sample Concentration is above the Illinois Groundwater Quality Standard for Class I Potable Resource Groundwater.

(3) — Sample Concentration is above both the MCL and the Illinois Class I Groundwater Quality Standard.

Table 4
Metals Results of September, 1993 Groundwater Sampling Event
NL/Taracorp Superfund Site

Parameter	Unit	MCLs (mg/L)	ILLINOIS CLASS I STANDARDS (mg/L)					MW-111-92 QC FIELD DUPLICATE	MW-112 QC RINSEATE BLANK
				MW-109	MW-109-92	MW-110	MW-111-92		
Antimony	mg/l	—	—	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Arsenic	mg/l	0.05	0.05	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Beryllium	mg/l	—	—	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Cadmium	mg/l	0.005	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Chromium	mg/l	0.1	0.1	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Copper	mg/l	1.3*	0.65	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Lead	mg/l	0.015*	0.0075	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Mercury	mg/l	0.002	0.002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Nickel	mg/l	0.1	0.1	0.059	<0.040	<0.040	<0.040	<0.040	<0.040
Selenium	mg/l	0.05	0.05	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Silver	mg/l	—	0.05	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Thallium	mg/l	—	—	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Zinc	mg/l	—	5.0	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020

* - Action Level that triggers treatment

(1) - Sample Concentration is above the MCL.

(2) - Sample Concentration is above the Illinois Groundwater Quality Standard for Class I Potable Resource Groundwater.

(3) - Sample Concentration is above both the MCL and the Illinois Class I Groundwater Quality Standard.

Table 5
Metals Results of Historical Groundwater Sampling Events
NL/Taracorp Superfund Site

Parameter	Unit	MCLs (mg/L)	ILLINOIS CLASS I STANDARDS (mg/L)	MW-101				MW-102
				JULY 1992	OCTOBER 1992	MARCH 1993	SEPTEMBER 1993	SEPTEMBER 1993
Antimony	mg/l	-	-	0.014	<0.011	<0.060	<0.050	<0.050
Arsenic	mg/l	0.05	0.05	4.2 (3)	0.77 (3)	0.46 (3)	0.181 (3)	0.015
Beryllium	mg/l	-	-	0.0026	<0.0006	0.0006	<0.005	<0.005
Cadmium	mg/l	0.005	0.005	0.0039	0.0053 (3)	<0.005	0.006 (3)	<0.005
Chromium	mg/l	0.1	0.1	0.034	0.018 U	0.077	0.047	0.027
Copper	mg/l	1.3*	0.65	0.06	0.017	0.039	0.063	0.028
Lead	mg/l	0.015*	0.0075	0.130 (3)	0.023 (3)	0.027 (3)	0.077 (3)	0.136 (3)
Mercury	mg/l	0.002	0.002	0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Nickel	mg/l	0.1	0.1	0.13 (3)	0.027	0.077	0.072	0.062
Selenium	mg/l	0.05	0.05	<0.003	<0.003	<0.003	0.007	0.015
Silver	mg/l	-	0.05	<0.0004	<0.009	<0.009	<0.010	<0.010
Thallium	mg/l	-	-	<0.002	<0.002	<0.002	<0.050	<0.050
Zinc	mg/l	-	5.0	0.35	0.098	0.11	0.199	0.123

U – The compound was analyzed for but was not detected.

The associated numerical value is attributed to contamination
and is considered to be the sample quantitation limit.

J – The associated numerical value is an estimated quantity.

* – Action Level that triggers treatment

(1) – Sample Concentration is above the MCL.

(2) – Sample Concentration is above the Illinois Groundwater Quality Standard
for Class I Potable Resource Groundwater.

(3) – Sample Concentration is above both the MCL and the Illinois Class I
Groundwater Quality Standard.

Table 5
Metals Results of Historical Groundwater Sampling Events
NL/Taracorp Superfund Site

Parameter	Unit	MCLs (mg/L)	ILLINOIS CLASS I STANDARDS (mg/L)	MW-103-91				MW-104			
				JULY 1992	OCTOBER 1992	MARCH 1993	SEPTEMBER 1993	JULY 1992	OCTOBER 1992	MARCH 1993	SEPTEMBER 1993
Antimony	mg/l	-	-	<0.002	0.014	<0.060	<0.050	0.023	0.013	<0.060	<0.050
Arsenic	mg/l	0.05	0.05	<0.003	<0.003	<0.003	<0.010	0.086 (3)	0.087 (3)	0.0046	0.018
Beryllium	mg/l	-	-	<0.0006	<0.0006	<0.0006	<0.005	0.0019	0.00322	<0.0006	<0.005
Cadmium	mg/l	0.005	0.005	0.0017	<0.005	<0.005	<0.005	0.0027	<0.005	<0.005	0.005 (3)
Chromium	mg/l	0.1	0.1	<0.002	0.029 U	<0.013	<0.010	0.047	0.098 J	<0.013	0.035
Copper	mg/l	1.3*	0.65	<0.014	<0.014	<0.014	<0.025	0.064	0.097	<0.014	<0.025
Lead	mg/l	0.015*	0.0075	0.0027	0.0038	<0.002	<0.003	0.47 (3)	0.42 (3)	0.013 (2)	0.043 (3)
Mercury	mg/l	0.002	0.002	0.0002	<0.0002	<0.0002	<0.0002	0.0003	0.0005	<0.0002	<0.0002
Nickel	mg/l	0.1	0.1	<0.023	<0.023	<0.023	<0.040	0.12 (3)	0.19 (3)	<0.023	0.047
Selenium	mg/l	0.05	0.05	<0.003	<0.003	<0.003	<0.005	<0.003	<0.003	<0.003	<0.005
Silver	mg/l	-	0.05	<0.0004	<0.009	<0.009	<0.010	<0.0004	<0.009	<0.009	<0.010
Thallium	mg/l	-	-	<0.002	<0.002	<0.002	<0.050	<0.002	<0.002	<0.002	<0.050
Zinc	mg/l	-	5.0	0.036	0.074 J	<0.020	<0.020	0.24	0.38 J	<0.020	0.072

U – The compound was analyzed for but was not detected.

The associated numerical value is attributed to contamination and is considered to be the sample quantitation limit.

J – The associated numerical value is an estimated quantity.

* – Action Level that triggers treatment

(1) – Sample Concentration is above the MCL.

(2) – Sample Concentration is above the Illinois Groundwater Quality Standard for Class I Potable Resource Groundwater.

(3) – Sample Concentration is above both the MCL and the Illinois Class I Groundwater Quality Standard.

Table 5
Metals Results of Historical Groundwater Sampling Events
NL/Taracorp Superfund Site

Parameter	Unit	MCLs (mg/L)	ILLINOIS CLASS I STANDARDS (mg/L)	MW-104-92				MW-105S SEPTEMBER 1993	MW-106S SEPTEMBER 1993
				JULY 1992	OCTOBER 1992	MARCH 1993	SEPTEMBER 1993		
Antimony	mg/l	-	-	0.007	0.01	<0.060	<0.050	<0.050	<0.050
Arsenic	mg/l	0.05	0.05	0.0088	0.0032	<0.003	<0.010	<0.010	0.014
Beryllium	mg/l	-	-	<0.0006	<0.0006	<0.0006	<0.005	<0.005	<0.005
Cadmium	mg/l	0.005	0.005	0.0033	<0.005	<0.005	0.005 (3)	<0.005	<0.005
Chromium	mg/l	0.1	0.1	0.002	0.034 J	<0.013	<0.010	0.029	0.476 (3)
Copper	mg/l	1.3*	0.65	<0.014	<0.014	<0.014	<0.025	<0.025	0.056
Lead	mg/l	0.015*	0.0075	0.44 (3)	0.27 (3)	0.043 (3)	0.520/0.480 (3)	0.015 (3)	0.143 (3)
Mercury	mg/l	0.002	0.002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Nickel	mg/l	0.1	0.1	<0.023	<0.023	<0.023	<0.040	<0.040	0.366 (3)
Selenium	mg/l	0.05	0.05	<0.003	<0.003	<0.003	<0.005	0.016	0.011
Silver	mg/l	-	0.05	<0.0004	<0.009	<0.009	<0.010	<0.010	<0.010
Thallium	mg/l	-	-	<0.002	<0.002	<0.002	<0.050	<0.050	<0.050
Zinc	mg/l	-	5.0	0.082	0.056 J	<0.020	0.037	0.039	0.181

U – The compound was analyzed for but was not detected.

The associated numerical value is attributed to contamination
and is considered to be the sample quantitation limit.

J – The associated numerical value is an estimated quantity.

* – Action Level that triggers treatment

(1) – Sample Concentration is above the MCL.

(2) – Sample Concentration is above the Illinois Groundwater Quality Standard
for Class I Potable Resource Groundwater.

(3) – Sample Concentration is above both the MCL and the Illinois Class I
Groundwater Quality Standard.

Table 5
Metals Results of Historical Groundwater Sampling Events
NL/Taracorp Superfund Site

Parameter	Unit	MCLs (mg/L)	ILLINOIS CLASS I STANDARDS (mg/L)	MW-106D				MW-107S			
				JULY 1992	OCTOBER 1992	MARCH 1993	SEPTEMBER 1993	JULY 1992	OCTOBER 1992	MARCH 1993	SEPTEMBER 1993
Antimony	mg/l	-	-	0.003	<0.011	<0.060	<0.050	0.008	<0.011	<0.060	<0.050
Arsenic	mg/l	0.05	0.05	0.013	0.0032	<0.003	<0.010	0.044	0.10 (3)	0.026	<0.010
Beryllium	mg/l	-	-	<0.0006	<0.0006	<0.0006	<0.005	0.002	0.0079	0.0019	<0.005
Cadmium	mg/l	0.005	0.005	0.0005	<0.005	<0.005	<0.005	0.0032	0.010 (3)	<0.005	<0.005
Chromium	mg/l	0.1	0.1	<0.002	0.015 U	<0.013	0.019	0.042	0.35 J (3)	0.061	0.014
Copper	mg/l	1.3*	0.65	<0.014	<0.014	<0.014	<0.025	0.064	0.3	0.066	<0.025
Lead	mg/l	0.015*	0.0075	0.019 (3)	0.019 (3)	<0.002	<0.003	0.14 (3)	0.52 (3)	0.087 (3)	0.047 (3)
Mercury	mg/l	0.002	0.002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.0006	<0.0002	<0.0002
Nickel	mg/l	0.1	0.1	<0.023	0.026	<0.023	<0.040	0.11 (3)	0.43 (3)	0.092	<0.040
Selenium	mg/l	0.05	0.05	0.0077	0.01	0.0098	0.013	<0.003	<0.003	<0.003	0.011
Silver	mg/l	-	0.05	<0.0004	<0.009	<0.009	<0.010	<0.0004	<0.009	<0.009	<0.010
Thallium	mg/l	-	-	<0.002	<0.002	<0.002	<0.050	<0.002	<0.002	<0.002	<0.050
Zinc	mg/l	-	5.0	<0.020	0.067	<0.020	<0.020	0.25	0.86	0.18	0.084

U – The compound was analyzed for but was not detected.

The associated numerical value is attributed to contamination and is considered to be the sample quantitation limit.

J – The associated numerical value is an estimated quantity.

* – Action Level that triggers treatment

(1) – Sample Concentration is above the MCL.

(2) – Sample Concentration is above the Illinois Groundwater Quality Standard for Class I Potable Resource Groundwater.

(3) – Sample Concentration is above both the MCL and the Illinois Class I Groundwater Quality Standard.

Table 5
Metals Results of Historical Groundwater Sampling Events
NL/Taracorp Superfund Site

Parameter	Unit	MCLs (mg/L)	ILLINOIS CLASS I STANDARDS (mg/L)	MW-107D				MW-108S SEPTEMBER 1993
				JULY 1992	OCTOBER 1992	MARCH 1993	SEPTEMBER 1993	
Antimony	mg/l	—	—	0.005	<0.011	0.060	<0.050	<0.050
Arsenic	mg/l	0.05	0.05	0.065 (3)	0.04	0.024	<0.010	0.109 (3)
Beryllium	mg/l	—	—	0.0016	0.0017	0.0006	<0.005	<0.005
Cadmium	mg/l	0.005	0.005	0.0018	<0.005	<0.005	<0.005	0.475 (3)
Chromium	mg/l	0.1	0.1	0.044	0.067 J	0.078	0.076	0.082
Copper	mg/l	1.3*	0.65	0.052	0.054	0.027	<0.025	0.092
Lead	mg/l	0.015*	0.0075	0.11 (3)	0.12 (3)	0.067 (3)	<0.003	1.02 (3)
Mercury	mg/l	0.002	0.002	<0.0002	0.0002	<0.0002	<0.0002	<0.0002
Nickel	mg/l	0.1	0.1	0.054	0.057	0.045	<0.040	0.254 (3)
Selenium	mg/l	0.05	0.05	<0.003	<0.003	<0.003	<0.005	<0.005
Silver	mg/l	—	0.05	<0.0004	<0.009	<0.009	<0.010	<0.010
Thallium	mg/l	—	—	<0.002	<0.002	<0.002	<0.050	0.07
Zinc	mg/l	—	5.0	0.22	0.25	0.091	0.05	0.567

U – The compound was analyzed for but was not detected.

The associated numerical value is attributed to contamination and is considered to be the sample quantitation limit.

J – The associated numerical value is an estimated quantity.

* – Action Level that triggers treatment

- (1) – Sample Concentration is above the MCL.
- (2) – Sample Concentration is above the Illinois Groundwater Quality Standard for Class I Potable Resource Groundwater.
- (3) – Sample Concentration is above both the MCL and the Illinois Class I Groundwater Quality Standard.

Table 5
Metals Results of Historical Groundwater Sampling Events
NL/Taracorp Superfund Site

Parameter	Unit	MCLs (mg/L)	ILLINOIS CLASS I STANDARDS (mg/L)	MW-108D				MW-108D QC FIELD DUPLICATE			
				JULY 1992	OCTOBER 1992	MARCH 1993	SEPTEMBER 1993	JULY 1992	OCTOBER 1992	MARCH 1993	SEPTEMBER 1993
Antimony	mg/l	—	—	<0.008	0.022	<0.060	<0.050	<0.002	<0.011	<0.060	<0.050
Arsenic	mg/l	0.05	0.05	<0.003	0.018	<0.003	<0.010	<0.003	0.023	<0.003	<0.010
Beryllium	mg/l	—	—	<0.0006	0.00202	<0.0006	<0.005	0.0007	0.00188	<0.0006	<0.005
Cadmium	mg/l	0.005	0.005	8.5 (3)	9.6 (3)	1.9 (3)	4.51 (3)	9.0 (3)	9.2 (3)	1.9 (3)	4.42 (3)
Chromium	mg/l	0.1	0.1	0.006	0.073 J	0.022	<0.010	0.006	0.084 J	0.029	<0.010
Copper	mg/l	1.3*	0.65	<0.014	0.045	<0.014	<0.025	<0.014	0.044	<0.014	<0.025
Lead	mg/l	0.015*	0.0075	0.023 (3)	0.14 (3)	0.0043	<0.003	0.026 (3)	0.15 (3)	0.0038	<0.003
Mercury	mg/l	0.002	0.002	<0.0002	0.0002	<0.0002	<0.0002	<0.0002	0.0002	<0.0002	<0.0002
Nickel	mg/l	0.1	0.1	0.46 (3)	0.63 (3)	0.17 (3)	0.313 (3)	0.47 (3)	0.64 (3)	0.18 (3)	0.302 (3)
Selenium	mg/l	0.05	0.05	<0.003	<0.003	<0.015	<0.005	<0.003	<0.003	<0.015	<0.005
Silver	mg/l	—	0.05	<0.0004	<0.009	<0.009	<0.010	<0.0004	<0.009	<0.009	<0.010
Thallium	mg/l	—	—	0.046	0.046	0.028	<0.050	0.048	0.051	0.029	0.05
Zinc	mg/l	—	5.0	28 (2)	34 (2)	7.6 (2)	18.1 (2)	28 (2)	34 (2)	7.7 (2)	17.9 (2)

U – The compound was analyzed for but was not detected.

The associated numerical value is attributed to contamination
and is considered to be the sample quantitation limit.

J – The associated numerical value is an estimated quantity.

* – Action Level that triggers treatment

(1) – Sample Concentration is above the MCL.

(2) – Sample Concentration is above the Illinois Groundwater Quality Standard
for Class I Potable Resource Groundwater.

(3) – Sample Concentration is above both the MCL and the Illinois Class I
Groundwater Quality Standard.

Table 5
Metals Results of Historical Groundwater Sampling Events
NL/Taracorp Superfund Site

Parameter	Unit	MCLs (mg/L)	ILLINOIS CLASS I STANDARDS (mg/L)	MW-109				MW-109-92			
				JULY 1992	OCTOBER 1992	MARCH 1993	SEPTEMBER 1993	JULY 1992	OCTOBER 1992	MARCH 1993	SEPTEMBER 1993
Antimony	mg/l	-	-	<0.002	<0.011	<0.060	<0.050	<0.002	<0.011	<0.060	<0.050
Arsenic	mg/l	0.05	0.05	<0.003	<0.003	<0.003	<0.010	<0.003	<0.003	<0.003	<0.010
Beryllium	mg/l	-	-	<0.0006	<0.0006	<0.0006	<0.005	<0.0006	<0.0006	<0.0006	<0.005
Cadmium	mg/l	0.005	0.005	0.0028	<0.005	<0.005	<0.005	0.0018	<0.005	<0.005	<0.005
Chromium	mg/l	0.1	0.1	<0.002	<0.013	<0.013	<0.010	0.003	0.021 U	<0.013	<0.010
Copper	mg/l	1.3*	0.65	<0.014	<0.014	<0.014	<0.025	<0.014	<0.014	<0.014	<0.025
Lead	mg/l	0.015*	0.0075	0.0046	0.019 (3)	<0.002	<0.003	0.018 (3)	0.0038	<0.002	<0.003
Mercury	mg/l	0.002	0.002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Nickel	mg/l	0.1	0.1	<0.023	<0.023	<0.023	0.059	<0.023	<0.023	<0.023	<0.040
Selenium	mg/l	0.05	0.05	<0.003	<0.003	<0.003	<0.005	<0.003	<0.003	<0.003	<0.005
Silver	mg/l	-	-	<0.0004	<0.009	<0.009	<0.010	<0.004	<0.009	<0.009	<0.010
Thallium	mg/l	-	-	<0.002	<0.002	<0.002	<0.050	<0.002	<0.002	<0.002	<0.050
Zinc	mg/l	-	5.0	0.057	0.077 J	<0.020	<0.020	0.081	0.057 J	<0.020	<0.020

U - The compound was analyzed for but was not detected.

The associated numerical value is attributed to contamination and is considered to be the sample quantitation limit.

J - The associated numerical value is an estimated quantity.

* - Action Level that triggers treatment

(1) - Sample Concentration is above the MCL.

(2) - Sample Concentration is above the Illinois Groundwater Quality Standard for Class I Potable Resource Groundwater.

(3) - Sample Concentration is above both the MCL and the Illinois Class I Groundwater Quality Standard.

Table 5
Metals Results of Historical Groundwater Sampling Events
NL/Taracorp Superfund Site

Parameter	Unit	MCLs (mg/L)	ILLINOIS CLASS I STANDARDS (mg/L)	MW-110				MW-111-92			
				JULY 1992	OCTOBER 1992	MARCH 1993	SEPTEMBER 1993	JULY 1992	OCTOBER 1992	MARCH 1993	SEPTEMBER 1993
Antimony	mg/l	-	-	<0.002	<0.011	<0.060	<0.050	<0.002	<0.011	<0.060	<0.050
Arsenic	mg/l	0.05	0.05	<0.003	<0.003	<0.003	<0.010	0.0046	0.0037	<0.003	<0.010
Beryllium	mg/l	-	-	<0.0006	<0.0006	<0.0006	<0.005	<0.0006	<0.0006	<0.0006	<0.005
Cadmium	mg/l	0.005	0.005	0.0013	<0.005	<0.005	<0.005	<0.0003	<0.005	<0.005	<0.005
Chromium	mg/l	0.1	0.1	<0.002	<0.013	<0.013	<0.010	<0.002	0.024 U	<0.013	<0.010
Copper	mg/l	1.3*	0.65	<0.014	<0.014	<0.014	<0.025	<0.014	<0.014	<0.014	<0.025
Lead	mg/l	0.015*	0.0075	0.0042	0.017(3)	<0.002	<0.003	0.003	0.009(2)	<0.002	<0.003
Mercury	mg/l	0.002	0.002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Nickel	mg/l	0.1	0.1	<0.023	0.033	<0.023	<0.040	<0.023	<0.023	<0.023	<0.040
Selenium	mg/l	0.05	0.05	<0.003	<0.003	<0.003	<0.005	<0.003	<0.003	<0.003	<0.005
Silver	mg/l	-	0.05	<0.0004	<0.009	<0.009	<0.010	<0.0004	<0.009	<0.009	<0.010
Thallium	mg/l	-	-	<0.002	<0.002	<0.002	<0.050	<0.002	<0.002	<0.002	<0.050
Zinc	mg/l	-	5.0	0.043	0.078	<0.020	<0.020	0.043	0.073	<0.020	<0.020

U – The compound was analyzed for but was not detected.

The associated numerical value is attributed to contamination and is considered to be the sample quantitation limit.

J – The associated numerical value is an estimated quantity.

* – Action Level that triggers treatment

(1) – Sample Concentration is above the MCL.

(2) – Sample Concentration is above the Illinois Groundwater Quality Standard for Class I Potable Resource Groundwater.

(3) – Sample Concentration is above both the MCL and the Illinois Class I Groundwater Quality Standard.

Table 5
Metals Results of Historical Groundwater Sampling Events
NL/Taracorp Superfund Site

Parameter	Unit	MCLs (mg/L)	ILLINOIS CLASS I STANDARDS (mg/L)	MW-111-92 QC FIELD DUPLICATE				MW-112 QC RINSEATE BLANK			
				JULY 1992	OCTOBER 1992	MARCH 1993	SEPTEMBER 1993	JULY 1992	OCTOBER 1992	MARCH 1993	SEPTEMBER 1993
Antimony	mg/l	—	—	<0.002	<0.011	<0.060	<0.050	<0.002	<0.011	<0.060	<0.050
Arsenic	mg/l	0.05	0.05	0.004	<0.003	<0.003	<0.010	0.0032	<0.003	<0.003	<0.010
Beryllium	mg/l	—	—	<0.0006	<0.0006	<0.0006	<0.005	<0.006	<0.006	<0.0006	<0.005
Cadmium	mg/l	0.005	0.005	0.0004	<0.005	<0.005	<0.005	<0.003	<0.005	<0.005	<0.005
Chromium	mg/l	0.1	0.1	<0.002	0.027 U	<0.013	<0.010	<0.002	<0.013	<0.013	<0.010
Copper	mg/l	1.3*	0.65	<0.014	<0.014	<0.014	<0.025	<0.014	<0.014	<0.014	<0.025
Lead	mg/l	0.015*	0.0075	0.0094 (2)	0.0072	<0.002	<0.003	<0.002	<0.002	<0.002	<0.003
Mercury	mg/l	0.002	0.002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Nickel	mg/l	0.1	0.1	<0.023	<0.023	<0.023	<0.040	<0.023	<0.023	<0.023	<0.040
Selenium	mg/l	0.05	0.05	<0.003	<0.003	<0.003	<0.005	<0.003	<0.003	<0.003	<0.005
Silver	mg/l	—	0.05	<0.0004	<0.009	<0.009	<0.010	<0.004	<0.009	<0.009	<0.010
Thallium	mg/l	—	—	<0.002	<0.002	<0.002	<0.050	<0.002	<0.002	<0.002	<0.050
Zinc	mg/l	—	5.0	0.059	0.068	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020

U – The compound was analyzed for but was not detected.

The associated numerical value is attributed to contamination
and is considered to be the sample quantitation limit.

J – The associated numerical value is an estimated quantity.

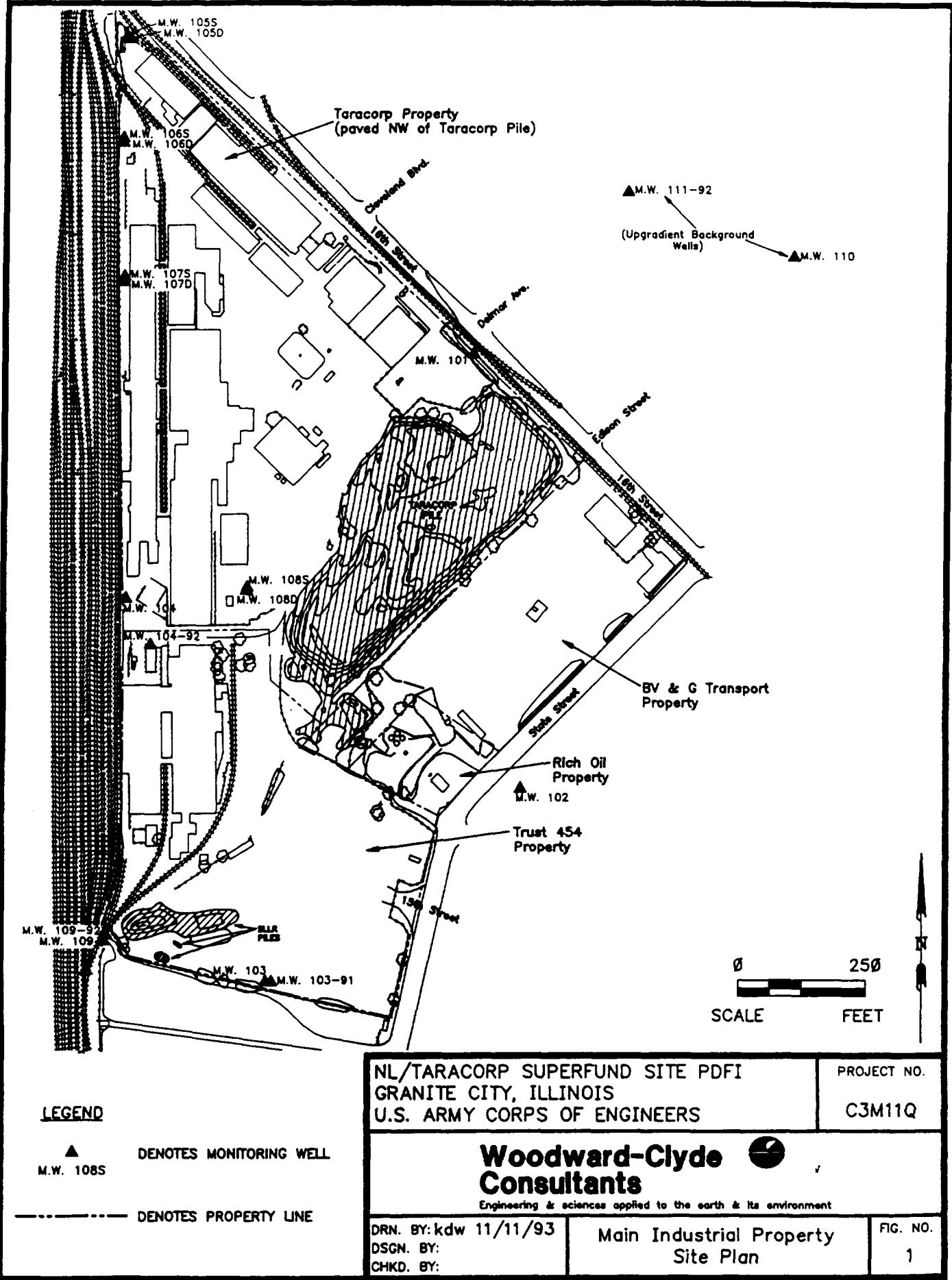
* – Action Level that triggers treatment

(1) – Sample Concentration is above the MCL.

(2) – Sample Concentration is above the Illinois Groundwater Quality Standard
for Class I Potable Resource Groundwater.

(3) – Sample Concentration is above both the MCL and the Illinois Class I
Groundwater Quality Standard.

FIGURE



APPENDIX

ANALYTICAL DATA

Groundwater Sample Identification Numbers Cross-Reference
September, 1993 Groundwater Sampling Event
NL/Taracorp Superfund Site

WCC FIELD SAMPLE NUMBER	ENVIRONMETRICS LABORATORY SAMPLE NUMBER	WCC QA SAMPLE NUMBER SENT TO USACE
WMW-10110GGW	93091085	
WMW-10210GG00W	93091155	
WMW-103910GGW	93091077	
WMW-103910GGWM	93091078	
WMW-103910GGWX	93091079	
WMW-104920GG00W	93091156	WMW010492GG0WQ (Well 104-92 QA sample), WMW104920GG0WS &WR (Well 104-92 matrix spike/ matrix dup.)
WMW-10410GG00W	93091157	WMW10410GG0WQ (Well no. 104 QA sample)
WMW105-S0GG00W	9309929	
WMW106-S0GG00W	9309930	
WMW106-D0GG00W	9309928	
WMW107-S0GG00W	9309931	
WMW107-D0GG00W	9309932	
WMW-108S0GGW	93091084	
WMW-108D0GGW	93091082	
WMW-108D0GGWD (Well No. 108-D Duplicate)	93091083	
WMW-109920GGW	93091080	
WMW-10910GGW	93091081	
WMW110-10GG00W	9309925	
WMW111920GG00W	9309926	
WMW111920GG0WD (Well no. 111-92 duplicate)	9309927	
WMW112-10GG0WB (Rinsate Blank)	9309933	
		WMW113-10GG0WT (Rinsate Blank)

METALS/WET CHEMISTRY DATA ASSESSMENT

PROJECT NO. C3M11Q-20
 LABORATORY Environmetrics
 LAB PROJECT NO. 23194
 NO. OF SAMPLES/
 MATRIX 9/water

SITE NL/Taracorp Superfund Site
 REVIEWER Dana Doerfler
 REVIEWER'S NAME Dana Doerfler
 COMPLETION DATE 10/13/93

DATA ASSESSMENT SUMMARY

	ICP	AA	Hg	CN	OTHER
1. HOLDING TIMES	✓	✓	✓	—	—
2. BLANKS	✓	✓	✓	—	—
3. ses Duplicate	✓	✓	✓	—	—
4. des MS/MSD	✓	✓	✓	—	—
5. DILUTION	NA	NA	NA	—	—
6. OTHER QC LCS	✓	✓	✓	—	—
7. OVERALL ASSESSMENT	0	0	0	—	—

O = Data had no problems/or qualified due to minor problems.

M = Data qualified due to major problems.

Z = Data unacceptable.

X = Problems, but do not affect data.

ACTION ITEMS: _____

COMMENTS: _____

ENVIRONMETRICS

WOODWARD-CLYDE CONSULTANTS
2318 MILLPARK DRIVE
MARYLAND HEIGHTS, MO 63043

2345 Millpark Drive
Maryland Heights, MO 63043
(314) 427-0550

ATTN: DAVID PATE

INVOICE # 23194
PROJECT # C3M11Q-20,
NL/TARACORP SUPERFUND SITE

PREPARATION BLANK

GRAPHITE FURNACE ATOMIC ABSORPTION

PREP. CODE: MP-117-57

PREP DATE: 9/20/93

<u>ELEMENT</u>	<u>BLANK RESULT</u>
ARSENIC	<0.010 mg/l
LEAD	<0.003
SELENIUM	<0.005

ENVIRONMETRICS

WOODWARD-CLYDE CONSULTANTS
2318 MILLPARK DRIVE
MARYLAND HEIGHTS, MO 63043

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Maryland Heights, MO 63043
(314) 427-0550

ATTN: DAVID PATE

INVOICE # 23194
PROJECT # C3M11Q-20,
NL/TARACORP SUPERFUND SITE

LABORATORY CONTROL SAMPLE

GRAPHITE FURNACE ATOMIC ABSORPTION

PREP. CODE: MP-117-57
PREP DATE: 9/20/93

<u>ELEMENT</u>	<u>VALUE</u>	<u>RESULT</u>	<u>PERCENT RECOVERY</u>
ARSENIC	0.050	0.049	98
LEAD	0.020	0.020	100
SELENIUM	0.025	0.025	98

ENVIRONMETRICS

WOODWARD-CLYDE CONSULTANTS
2318 MILLPARK DRIVE
MARYLAND HEIGHTS, MO 63043

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ATTN: DAVID PATE

INVOICE # 23194
PROJECT # C3M11Q-20,
NL/TARACORP SUPERFUND SITE

PREPARATION BLANK

ICP/AA

PREP. CODE: MP-145-35
PREP DATE: 9/21/93

<u>ELEMENT</u>	<u>BLANK RESULT</u>
ANTIMONY	<0.050
ARSENIC	<0.200
BERYLLIUM	<0.005
CADMIUM	<0.005
CHROMIUM	<0.010
COPPER	<0.025
LEAD	<0.100
MERCURY	<0.0002
NICKEL	<0.040
SELENIUM	<0.200
SILVER	<0.010
THALLIUM	<0.050
ZINC	<0.020

ENVIRONMETRICS

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ATTN: DAVID PATE

INVOICE # 23194
PROJECT # C3M11Q-20,
NL/TARACORP SUPERFUND SITE

LABORATORY CONTROL SAMPLE

ICP/AA

PREP. CODE: MP-145-35
PREP DATE: 9/21/93

<u>ELEMENT</u>	<u>VALUE</u>	<u>RESULT</u>	<u>PERCENT RECOVERY</u>
ANTIMONY	0.50	0.464	93
ARSENIC	2.00	1.99	100
BERYLLIUM	0.50	0.486	97
CADMIUM	0.50	0.489	98
CHROMIUM	0.50	0.516	103
COPPER	0.50	0.484	97
LEAD	0.50	0.510	102
MERCURY	0.0020	0.0020	100
NICKEL	0.50	0.496	99
SELENIUM	2.00	1.99	100
SILVER	0.50	0.484	97
THALLIUM	2.00	2.00	100
ZINC	0.50	0.488	98

ENVIRONMETRICS

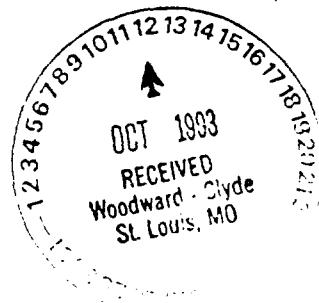
WOODWARD-CLYDE CONSULTANTS
2318 MILLPARK DRIVE
MARYLAND HEIGHTS, MO 63043

2345 Millpark Drive
Maryland Heights, MO 63043
(314) 427-0550

ATTN: DAVID PATE

INVOICE # 23194
PROJECT # C3M11Q-20,
NL/TARACORP SUPERFUND SITE

ANALYSIS RESULTS



SAMPLE ID: WMW110-10GG00W
LAB ID: 9309925
DATE COLLECTED: 9/15/93 17:08

<u>TEST PERFORMED</u>	<u>METHOD OF ANALYSIS</u>	<u>RESULTS</u>
		<u>TOTAL</u>
METALS ANALYSIS		
ANTIMONY	SW-846 6010	<0.050 mg/l
ARSENIC	SW-846 7060	<0.010
BERYLLIUM	SW-846 6010	<0.005
CADMIUM	SW-846 6010	<0.005
CHROMIUM	SW-846 6010	<0.010
COPPER	SW-846 6010	<0.025
MERCURY	SW-846 7470	<0.0002
LEAD	SW-846 7421	<0.003
NICKEL	SW-846 6010	<0.040
SELENIUM	SW-846 7740	<0.005
SILVER	SW-846 6010	<0.010
THALLIUM	SW-846 6010	<0.050
ZINC	SW-846 6010	<0.020

SEPTEMBER 30, 1993

WAYNE L. COOPER
LABORATORY DIRECTOR

ENVIRONMETRICS

WOODWARD-CLYDE CONSULTANTS
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(314) 427-0550

ATTN: DAVID PATE

INVOICE # 23194
PROJECT # C3M11Q-20,
NL/TARACORP SUPERFUND SITE

QUALITY ASSURANCE QUALITY CONTROL REPORT

DUPLICATE REPORT FORM GRAPHITE FURNACE ATOMIC ABSORPTION

SAMPLE ID: WMW110-10GG00W

LAB ID: 9309925

PREP ID: MP-117-57

<u>ELEMENT</u>	<u>SAMPLE RESULTS</u>	<u>DUPLICATE RESULTS</u>	<u>PERCENT DIFFERENCE</u>
ARSENIC	<0.010	<0.010	N/C
LEAD	<0.003	0.0045	73
SELENIUM	<0.005	<0.005	N/C

ENVIRONMETRICS

WOODWARD-CLYDE CONSULTANTS
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(314) 427-0550

ATTN: DAVID PATE

INVOICE # 23194
PROJECT # C3M11Q-20,
NL/TARACORP SUPERFUND SITE

QUALITY ASSURANCE QUALITY CONTROL REPORT

DUPLICATE REPORT FORM ICP/AA

SAMPLE ID: WMW110-10GG00W
LAB ID: 9309925
PREP ID: MP-145-34

<u>ELEMENT</u>	<u>SAMPLE RESULTS</u>	<u>DUPLICATE RESULTS</u>	<u>PERCENT DIFFERENCE</u>
ANTIMONY	<0.050	<0.050	N/C
BERYLLIUM	<0.005	<0.005	N/C
CADMIUM	<0.005	<0.005	N/C
CHROMIUM	<0.010	<0.010	N/C
COPPER	<0.025	<0.025	N/C
MERCURY	<0.0002	<0.0002	N/C
NICKEL	<0.040	<0.040	N/C
SILVER	<0.010	<0.010	N/C
THALLIUM	<0.050	<0.050	N/C
ZINC	<0.020	<0.020	N/C

ENVIRONMETRICS

WOODWARD-CLYDE CONSULTANTS
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Maryland Heights, MO 63043
(314) 427-0550

ATTN: DAVID PATE

INVOICE # 23194
PROJECT # C3M11Q-20,
NL/TARACORP SUPERFUND SITE

QUALITY ASSURANCE QUALITY CONTROL REPORT

MATRIX SPIKE/MATRIX SPIKE DUPLICATE GRAPHITE FURNACE ATOMIC ABSORPTION

SAMPLE ID: WMW110-10GG00W

LAB ID: 9309925

PREP ID: MP-117-57

<u>ELEMENT</u>	<u>SAMPLE RESULTS</u>	<u>SPIKE LEVEL</u>	<u>DUPLICATE RESULTS</u>	<u>PERCENT DIFFERENCE</u>
ARSENIC	<0.010	0.040	0.035	88
LEAD	<0.003	0.020	0.025	125
SELENIUM	<0.005	0.010	0.007	72

ENVIRONMETRICS

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PROJECT # C3M11Q-20,
NL/TARACORP SUPERFUND SITE

QUALITY ASSURANCE QUALITY CONTROL REPORT

MATRIS SPIKE/MATRIX SPIKE DUPLICATE ICP/AA

SAMPLE ID: WMW110-10GG00W
LAB ID: 9309925
PREP ID: MP-145-34

<u>ELEMENT</u>	<u>SAMPLE RESULTS</u>	<u>SPIKE LEVEL</u>	<u>DUPLICATE RESULTS</u>	<u>PERCENT DIFFERENCE</u>
ANTIMONY	<0.050	1.000	0.686	69
BERYLLIUM	<0.005	0.100	0.096	96
CADMIUM	<0.005	0.100	0.099	99
CHROMIUM	<0.010	0.400	0.386	96
COPPER	<0.025	0.500	0.485	97
MERCURY	0.0002	0.0020	0.0020	100
NICKEL	<0.040	1.000	1.01	101
SILVER	<0.010	0.100	0.104	104
THALLIUM	<0.050	4.000	3.77	94
ZINC	<0.020	1.000	0.973	97

ENVIRONMETRICS

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(314) 427-0550

ATTN: DAVID PATE

INVOICE # 23194
PROJECT # C3M11Q-20,
NL/TARACORP SUPERFUND SITE



ANALYSIS RESULTS

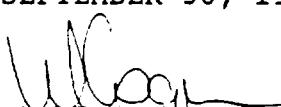
SAMPLE ID: WMW110-10GG00W

LAB ID: 9309925

DATE COLLECTED: 9/15/93 17:08

<u>TEST PERFORMED</u>	<u>METHOD OF ANALYSIS</u>	<u>RESULTS</u>
METALS ANALYSIS		<u>TOTAL</u>
ANTIMONY	SW-846 6010	<0.050 mg/l
ARSENIC	SW-846 7060	<0.010
BERYLLIUM	SW-846 6010	<0.005
CADMIUM	SW-846 6010	<0.005
CHROMIUM	SW-846 6010	<0.010
COPPER	SW-846 6010	<0.025
MERCURY	SW-846 7470	<0.0002
LEAD	SW-846 7421	<0.003
NICKEL	SW-846 6010	<0.040
SELENIUM	SW-846 7740	<0.005
SILVER	SW-846 6010	<0.010
THALLIUM	SW-846 6010	<0.050
ZINC	SW-846 6010	<0.020

SEPTEMBER 30, 1993


WAYNE L. COOPER
LABORATORY DIRECTOR

ENVIRONMETRICS

WOODWARD-CLYDE CONSULTANTS
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ATTN: DAVID PATE

INVOICE # 23194
PROJECT # C3M11Q-20,
NL/TARACORP SUPERFUND SITE

QUALITY ASSURANCE QUALITY CONTROL REPORT

DUPLICATE REPORT FORM GRAPHITE FURNACE ATOMIC ABSORPTION

SAMPLE ID: WMW110-10GG00W
LAB ID: 9309925
PREP ID: MP-117-57

<u>ELEMENT</u>	<u>SAMPLE RESULTS</u>	<u>DUPLICATE RESULTS</u>	<u>PERCENT DIFFERENCE</u>
ARSENIC	<0.010	<0.010	N/C
LEAD	<0.003	0.0045	73
SELENIUM	<0.005	<0.005	N/C

ENVIRONMETRICS

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NL/TARACORP SUPERFUND SITE

QUALITY ASSURANCE QUALITY CONTROL REPORT

DUPLICATE REPORT FORM ICP/AA

SAMPLE ID: WMW110-10GG00W
LAB ID: 9309925
PREP ID: MP-145-34

<u>ELEMENT</u>	<u>SAMPLE RESULTS</u>	<u>DUPLICATE RESULTS</u>	<u>PERCENT DIFFERENCE</u>
ANTIMONY	<0.050	<0.050	N/C
BERYLLIUM	<0.005	<0.005	N/C
CADMIUM	<0.005	<0.005	N/C
CHROMIUM	<0.010	<0.010	N/C
COPPER	<0.025	<0.025	N/C
MERCURY	<0.0002	<0.0002	N/C
NICKEL	<0.040	<0.040	N/C
SILVER	<0.010	<0.010	N/C
THALLIUM	<0.050	<0.050	N/C
ZINC	<0.020	<0.020	N/C

ENVIRONMETRICS

WOODWARD-CLYDE CONSULTANTS
2318 MILLPARK DRIVE
MARYLAND HEIGHTS, MO 63043

2345 Millpark Drive
Maryland Heights, MO 63043
(314) 427-0550

ATTN: DAVID PATE

INVOICE # 23194
PROJECT # C3M11Q-20,
NL/TARACORP SUPERFUND SITE

QUALITY ASSURANCE QUALITY CONTROL REPORT

MATRIX SPIKE/MATRIX SPIKE DUPLICATE GRAPHITE FURNACE ATOMIC ABSORPTION

SAMPLE ID: WMW110-10GG00W
LAB ID: 9309925
PREP ID: MP-117-57

<u>ELEMENT</u>	<u>SAMPLE RESULTS</u>	<u>SPIKE LEVEL</u>	<u>DUPLICATE RESULTS</u>	<u>PERCENT DIFFERENCE</u>
ARSENIC	<0.010	0.040	0.035	88
LEAD	<0.003	0.020	0.025	125
SELENIUM	<0.005	0.010	0.007	72

ENVIRONMETRICS

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ATTN: DAVID PATE

INVOICE # 23194
PROJECT # C3M11Q-20,
NL/TARACORP SUPERFUND SITE

QUALITY ASSURANCE QUALITY CONTROL REPORT

MATRIS SPIKE/MATRIX SPIKE DUPLICATE ICP/AA

SAMPLE ID: WMW110-10GG00W
LAB ID: 9309925
PREP ID: MP-145-34

<u>ELEMENT</u>	<u>SAMPLE RESULTS</u>	<u>SPIKE LEVEL</u>	<u>DUPLICATE RESULTS</u>	<u>PERCENT DIFFERENCE</u>
ANTIMONY	<0.050	1.000	0.686	69
BERYLLIUM	<0.005	0.100	0.096	96
CADMIUM	<0.005	0.100	0.099	99
CHROMIUM	<0.010	0.400	0.386	96
COPPER	<0.025	0.500	0.485	97
MERCURY	0.0002	0.0020	0.0020	100
NICKEL	<0.040	1.000	1.01	101
SILVER	<0.010	0.100	0.104	104
THALLIUM	<0.050	4.000	3.77	94
ZINC	<0.020	1.000	0.973	97

ENVIRONMETRICS

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ATTN: DAVID PATE

INVOICE # 23194
PROJECT # C3M11Q-20,
NL/TARACORP SUPERFUND SITE

ANALYSIS RESULTS

SAMPLE ID: WMW111920GG00W
LAB ID: 9309926
DATE COLLECTED: 9/16/93 9:40

<u>TEST PERFORMED</u>	<u>METHOD OF ANALYSIS</u>	<u>RESULTS</u>
METALS ANALYSIS		TOTAL
ANTIMONY	SW-846 6010	<0.050 mg/l
ARSENIC	SW-846 7060	<0.010
BERYLLIUM	SW-846 6010	<0.005
CADMIUM	SW-846 6010	<0.005
CHROMIUM	SW-846 6010	<0.010
COPPER	SW-846 6010	<0.025
MERCURY	SW-846 7470	<0.0002
LEAD	SW-846 7421	<0.003
NICKEL	SW-846 6010	<0.040
SELENIUM	SW-846 7740	<0.005
SILVER	SW-846 6010	<0.010
THALLIUM	SW-846 6010	<0.050
ZINC	SW-846 6010	<0.020

SEPTEMBER 30, 1993


WAYNE L. COOPER
LABORATORY DIRECTOR

ENVIRONMETRICS

WOODWARD-CLYDE CONSULTANTS
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(314) 427-0550

ATTN: DAVID PATE

INVOICE # 23194
PROJECT # C3M11Q-20,
NL/TARACORP SUPERFUND SITE

ANALYSIS RESULTS

SAMPLE ID: WMW111920GG0WD
LAB ID: 9309927
DATE COLLECTED: 9/16/93 9:40

<u>TEST PERFORMED</u>	<u>METHOD OF ANALYSIS</u>	<u>RESULTS</u>
METALS ANALYSIS		TOTAL
ANTIMONY	SW-846 6010	<0.050 mg/l
ARSENIC	SW-846 7060	<0.010
BERYLLIUM	SW-846 6010	<0.005
CADMIUM	SW-846 6010	<0.005
CHROMIUM	SW-846 6010	<0.010
COPPER	SW-846 6010	<0.025
MERCURY	SW-846 7470	<0.0002
LEAD	SW-846 7421	<0.003
NICKEL	SW-846 6010	<0.040
SELENIUM	SW-846 7740	<0.005
SILVER	SW-846 6010	<0.010
THALLIUM	SW-846 6010	<0.050
ZINC	SW-846 6010	<0.020

SEPTEMBER 30, 1993


WAYNE L. COOPER
LABORATORY DIRECTOR

ENVIRONMETRICS

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2318 MILLPARK DRIVE
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(314) 427-0550

ATTN: DAVID PATE

INVOICE # 23194
PROJECT # C3M11Q-20,
NL/TARACORP SUPERFUND SITE

ANALYSIS RESULTS

SAMPLE ID: WMW106-DOGGOOOW

LAB ID: 9309928

DATE COLLECTED: 9/16/93 11:45

<u>TEST PERFORMED</u>	<u>METHOD OF ANALYSIS</u>	<u>RESULTS</u>
METALS ANALYSIS		TOTAL
ANTIMONY	SW-846 6010	<0.050 mg/l
ARSENIC	SW-846 7060	<0.010
BERYLLIUM	SW-846 6010	<0.005
CADMIUM	SW-846 6010	<0.005
CHROMIUM	SW-846 6010	0.019
COPPER	SW-846 6010	<0.025
MERCURY	SW-846 7470	<0.0002
LEAD	SW-846 7421	<0.003
NICKEL	SW-846 6010	<0.040
SELENIUM	SW-846 7740	0.013
SILVER	SW-846 6010	<0.010
THALLIUM	SW-846 6010	<0.050
ZINC	SW-846 6010	<0.020

SEPTEMBER 30, 1993


WAYNE L. COOPER
LABORATORY DIRECTOR

ENVIRONMETRICS

WOODWARD-CLYDE CONSULTANTS
2318 MILLPARK DRIVE
MARYLAND HEIGHTS, MO 63043

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Maryland Heights, MO 63043
(314) 427-0550

ATTN: DAVID PATE

INVOICE # 23194
PROJECT # C3M11Q-20,
NL/TARACORP SUPERFUND SITE

ANALYSIS RESULTS

SAMPLE ID: WMW105-SOGGOOW

LAB ID: 9309929

DATE COLLECTED: 9/16/93 14:00

<u>TEST PERFORMED</u>	<u>METHOD OF ANALYSIS</u>	<u>RESULTS</u>
METALS ANALYSIS		TOTAL
ANTIMONY	SW-846 6010	<0.050 mg/l
ARSENIC	SW-846 7060	<0.010
BERYLLIUM	SW-846 6010	<0.005
CADMIUM	SW-846 6010	<0.005
CHROMIUM	SW-846 6010	0.029
COPPER	SW-846 6010	<0.025
MERCURY	SW-846 7470	<0.0002
LEAD	SW-846 7421	0.015
NICKEL	SW-846 6010	<0.040
SELENIUM	SW-846 7740	0.016
SILVER	SW-846 6010	<0.010
THALLIUM	SW-846 6010	<0.050
ZINC	SW-846 6010	0.039

SEPTEMBER 30, 1993


WAYNE L. COOPER
LABORATORY DIRECTOR

ENVIRONMETRICS

WOODWARD-CLYDE CONSULTANTS
2318 MILLPARK DRIVE
MARYLAND HEIGHTS, MO 63043

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(314) 427-0550

ATTN: DAVID PATE

INVOICE # 23194
PROJECT # C3M11Q-20,
NL/TARACORP SUPERFUND SITE

ANALYSIS RESULTS

SAMPLE ID: WMW106-SOGG00W

LAB ID: 9309930

DATE COLLECTED: 9/16/93 14:55

<u>TEST PERFORMED</u>	<u>METHOD OF ANALYSIS</u>	<u>RESULTS</u>
METALS ANALYSIS		<u>TOTAL</u>
ANTIMONY	SW-846 6010	<0.050 mg/l
ARSENIC	SW-846 7060	0.014
BERYLLIUM	SW-846 6010	<0.005
CADMIUM	SW-846 6010	<0.005
CHROMIUM	SW-846 6010	0.476
COPPER	SW-846 6010	0.056
MERCURY	SW-846 7470	<0.0002
LEAD	SW-846 7421	0.143
NICKEL	SW-846 6010	0.366
SELENIUM	SW-846 7740	0.011
SILVER	SW-846 6010	<0.010
THALLIUM	SW-846 6010	<0.050
ZINC	SW-846 6010	0.181

SEPTEMBER 30, 1993


WAYNE L. COOPER
LABORATORY DIRECTOR

ENVIRONMETRICS

WOODWARD-CLYDE CONSULTANTS
2318 MILLPARK DRIVE
MARYLAND HEIGHTS, MO 63043

2345 Millpark Drive
Maryland Heights, MO 63043
(314) 427-0550

ATTN: DAVID PATE

INVOICE # 23194
PROJECT # C3M11Q-20,
NL/TARACORP SUPERFUND SITE

ANALYSIS RESULTS

SAMPLE ID: WMW107-S0GG00W
LAB ID: 9309931
DATE COLLECTED: 9/16/93 16:40

<u>TEST PERFORMED</u>	<u>METHOD OF ANALYSIS</u>	<u>RESULTS</u>
METALS ANALYSIS		TOTAL
ANTIMONY	SW-846 6010	<0.050 mg/l
ARSENIC	SW-846 7060	<0.010
BERYLLIUM	SW-846 6010	<0.005
CADMIUM	SW-846 6010	<0.005
CHROMIUM	SW-846 6010	0.014
COPPER	SW-846 6010	<0.025
MERCURY	SW-846 7470	<0.0002
LEAD	SW-846 7421	0.047
NICKEL	SW-846 6010	<0.040
SELENIUM	SW-846 7740	0.011
SILVER	SW-846 6010	<0.010
THALLIUM	SW-846 6010	<0.050
ZINC	SW-846 6010	0.084

SEPTEMBER 30, 1993


WAYNE L. COOPER
LABORATORY DIRECTOR

ENVIRONMETRICS

WOODWARD-CLYDE CONSULTANTS
2318 MILLPARK DRIVE
MARYLAND HEIGHTS, MO 63043

2345 Millpark Drive
Maryland Heights, MO 63043
(314) 427-0550

ATTN: DAVID PATE

INVOICE # 23194
PROJECT # C3M11Q-20,
NL/TARACORP SUPERFUND SITE

ANALYSIS RESULTS

SAMPLE ID: WMW107-DOGG00W
LAB ID: 9309932
DATE COLLECTED: 9/16/93 16:50

<u>TEST PERFORMED</u>	<u>METHOD OF ANALYSIS</u>	<u>RESULTS</u>
METALS ANALYSIS		TOTAL
ANTIMONY	SW-846 6010	<0.050 mg/l
ARSENIC	SW-846 7060	<0.010
BERYLLIUM	SW-846 6010	<0.005
CADMIUM	SW-846 6010	<0.005
CHROMIUM	SW-846 6010	0.076
COPPER	SW-846 6010	<0.025
MERCURY	SW-846 7470	<0.0002
LEAD	SW-846 7421	<0.003
NICKEL	SW-846 6010	<0.040
SELENIUM	SW-846 7740	<0.005
SILVER	SW-846 6010	<0.010
THALLIUM	SW-846 6010	<0.050
ZINC	SW-846 6010	0.050

SEPTEMBER 30, 1993


WAYNE L. COOPER
LABORATORY DIRECTOR

ENVIRONMETRICS

WOODWARD-CLYDE CONSULTANTS
2318 MILLPARK DRIVE
MARYLAND HEIGHTS, MO 63043

2345 Millpark Drive
Maryland Heights, MO 63043
(314) 427-0550

ATTN: DAVID PATE

INVOICE # 23194
PROJECT # C3M11Q-20,
NL/TARACORP SUPERFUND SITE

ANALYSIS RESULTS

SAMPLE ID: WMW112-10GGOWB

LAB ID: 9309933

DATE COLLECTED: 9/16/93 17:15

<u>TEST PERFORMED</u>	<u>METHOD OF ANALYSIS</u>	<u>RESULTS</u>
METALS ANALYSIS		<u>TOTAL</u>
ANTIMONY	SW-846 6010	<0.050 mg/1
ARSENIC	SW-846 7060	<0.010
BERYLLIUM	SW-846 6010	<0.005
CADMIUM	SW-846 6010	<0.005
CHROMIUM	SW-846 6010	<0.010
COPPER	SW-846 6010	<0.025
MERCURY	SW-846 7470	<0.0002
LEAD	SW-846 7421	<0.003
NICKEL	SW-846 6010	<0.040
SELENIUM	SW-846 7740	<0.005
SILVER	SW-846 6010	<0.010
THALLIUM	SW-846 6010	<0.050
ZINC	SW-846 6010	<0.020

SEPTEMBER 30, 1993


WAYNE L. COOPER
LABORATORY DIRECTOR

Maryland Heights, MO 63043
(314) 427-0550

CUSTODY TRANSFER REQUEST/LABORATORY WORK REQUEST

COMPANY Environmental Works CONTACT Sgt. J. P. Fawcett
ADDRESS 6120 Maryland Ave. DATE 10/17/04
CITY/STATE/ZIP Maryland Heights, MO 63043 DUE DATE 10/24/04
PHONE (314) 961-0000 FAX (314) 961-7277
RPN AROUND TIME/INSTRUCTIONS: (DO NOT DELAY)

COC # JL 44-202

PROPOSAL # K1491

PROJECT # C3MTHS-20

PO #

PAGE 1 OF 1

SAMPLE IDENTIFICATION

ITEM	FOR LAB USE ONLY	SITE CODE/ SAMPLE DESCRIPTION	DATE COLLECTED	PRESERV.	CONTAINER	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	7309925	Wm Min 1 - 1066-mmW	11/12/04	Nitric	Plast. Litter	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
2	7309926	Wm Min 1 - 1066-mmW	11/13/04			X	X	X	X	X	X	X	X	X	X	X	X	X	X	
3	7309927	Wm Min 1 - 1066-mmW	11/14/04			X	X	X	X	X	X	X	X	X	X	X	X	X	X	
4	7309928	Wm Min 106 - 1066-mmW	11/15/04			X	X	X	X	X	X	X	X	X	X	X	X	X	X	
5	7309929	Wm Min 106 - 1066-mmW	11/16/04			X	X	X	X	X	X	X	X	X	X	X	X	X	X	
6	7309930	Wm Min 106 - 1066-mmW	11/17/04			X	X	X	X	X	X	X	X	X	X	X	X	X	X	
7	7309931	Wm Min 106 - 1066-mmW	11/18/04			X	X	X	X	X	X	X	X	X	X	X	X	X	X	
8	7309932	Wm Min 106 - 1066-mmW	11/19/04			X	X	X	X	X	X	X	X	X	X	X	X	X	X	
9	7309933	Wm Min 106 - 1066-mmW	11/20/04			X	X	X	X	X	X	X	X	X	X	X	X	X	X	
10																				
11																				
12																				
13																				
14																				
15																				

ITEMS TRANSFERRED	RELINQUISHED BY	Date	Time	RECEIVED BY	Date	Time	REASON for TRANSFER	COMMENTS:
1				John Fawcett	10/17	7:24	High	
2	Chad Johnson	9/21	8:20	John Fawcett	10/20	7:20	High	
3	Chad Johnson	9/21	3:10	CMW	9/21	3:10	Return	

WOODWARD-CLYDE CONSULTANTS
2318 MILLPARK DR.
MARYLAND HEIGHTS, MISSOURI 63043
314-429-0100

PROJECT NO:	PROJECT NAME:	CONTAINER NO. OF	CONTAINER DESCRIPTION / ANALYSES REQUESTED					REMARKS
C3M11Q-20	NL/Taracorp Superfund Site			Titanium	Metals	Nitric Acid	pH 2	
SAMPLER'S (Signature)	C. Pavlik							
DATE	TIME	SAMPLE I.D. NUMBER						
9/15/93	17:08	WMW110 - 1ØGGØØW	1	X				
9/16/93	9:40	WMW11192 ØGGØØW	1	X				
9/16/93	9:40	WMW11192ØGGØWD	1	X				
"	11:45	WMW1Ø6 - DØGGØØW	1	X				
"	14:00	WMW1Ø5 - SØGGØØW	1	X				
"	14:55	WMW1Ø6 - SØGGØØW	1	X				
"	16:40	WMW1Ø7 - SØGGØØW	1	X				
"	16:50	WMW1Ø7 - DØGGØØW	1	X				
"	17:15	WMW112 - 1ØGGØWB	1	X				
RELINQUISHED BY: (Signature)		DATE / TIME	RECEIVED BY: (Signature)			DATE / TIME		
Cynthia Pavlik		9/16/93 19:00	Lisa Steele			9-17-93 8:35		
RELINQUISHED BY: (Signature)		DATE / TIME	RECEIVED AT LAB BY: (Signature)			DATE / TIME		
METHOD OF SHIPMENT:		AIRBILL NO:						
WCC Employee								

METALS/WET CHEMISTRY DATA ASSESSMENT

PROJECT NO. C3M11Q
 LABORATORY Environmetrics
 LAB PROJECT NO. 23221
 NO. OF SAMPLES/
 MATRIX 9/water

SITE NLTSS
 REVIEWER Dana Doerfler
 REVIEWER'S NAME Dana Doerfler
 COMPLETION DATE 10-15-93

DATA ASSESSMENT SUMMARY

	ICP	AA	Hg	CN	OTHER
1. HOLDING TIMES	✓	✓	✓	—	—
2. BLANKS	✓	✓	✓	—	—
3. SCS LCS	✓	✓	✓	—	—
4. DES Duplicate	✓	✓	✓	—	—
5. DILUTION	NA	NA	NA	—	—
6. OTHER QC MS/MSD	✓	✓	✓	—	—
7. OVERALL ASSESSMENT	0	0	0	—	—

O = Data had no problems/or qualified due to minor problems.

M = Data qualified due to major problems.

Z = Data unacceptable.

X = Problems, but do not affect data.

ACTION ITEMS: _____

COMMENTS: _____

ENVIRONMETRICS

WOODWARD-CLYDE CONSULTANTS
2318 MILLPARK DRIVE
MARYLAND HEIGHTS, MO 63043

2345 Millpark Drive
Maryland Heights, MO 63043
(314) 427-0550

ATTN: DAVID PATE

INVOICE # 23221
PROJECT # C3M11Q

ANALYSIS RESULTS



SAMPLE ID: WMW-103910GGW
LAB ID: 93091077
DATE COLLECTED: 9/17/93

<u>TEST PERFORMED</u>	<u>METHOD OF ANALYSIS</u>	<u>RESULTS</u>
METALS ANALYSIS		TOTAL
ANTIMONY	SW-846 6010	<0.050 mg/l
ARSENIC	SW-846 7060	<0.010
BERYLLIUM	SW-846 6010	<0.005
CADMIUM	SW-846 6010	<0.005
CHROMIUM	SW-846 6010	<0.010
COPPER	SW-846 6010	<0.025
LEAD	SW-846 7421	<0.003
MERCURY	SW-846 7470	<0.0002
NICKEL	SW-846 6010	<0.040
SELENIUM	SW-846 7740	<0.005
SILVER	SW-846 6010	<0.010
THALLIUM	SW-846 6010	<0.050
ZINC	SW-846 6010	<0.020

OCTOBER 4, 1993

WAYNE L. COOPER
LABORATORY DIRECTOR

ENVIRONMETRICS

WOODWARD-CLYDE CONSULTANTS
2318 MILLPARK DRIVE
MARYLAND HEIGHTS, MO 63043

2345 Millpark Drive
Maryland Heights, MO 63043
(314) 427-0550

ATTN: DAVID PATE

INVOICE # 23221
PROJECT # C3M11Q

QUALITY ASSURANCE QUALITY CONTROL REPORT

DUPLICATE REPORT FORM GRAPHITE FURNACE ATOMIC ABSORPTION

SAMPLE ID: WMW-103910GGW
LAB ID: 93091077
PREP CODE: MP-117-58

ELEMENT	SAMPLE RESULT	DUPLICATE RESULTS	PERCENT DIFFERENCE
ARSENIC	<0.010	<0.010	0
LEAD	<0.003	<0.003	0
SELENIUM	<0.005	<0.005	0

ENVIRONMETRICS

WOODWARD-CLYDE CONSULTANTS
2318 MILLPARK DRIVE
MARYLAND HEIGHTS, MO 63043

2345 Millpark Drive
Maryland Heights, MO 63043
(314) 427-0550

ATTN: DAVID PATE

INVOICE # 23221
PROJECT # C3M11Q

QUALITY ASSURANCE QUALITY CONTROL REPORT

MATRIX SPIKE/MATRIX SPIKE DUPLICATE GRAPHITE FURNACE ATOMIC ABSORPTION

SAMPLE ID: WMW-103910GGW
LAB ID: 93091077
PREP CODE: MP-117-58

<u>ELEMENT</u>	<u>SAMPLE RESULT</u>	<u>SPIKE LEVEL</u>	<u>SPIKE RESULTS</u>	<u>PERCENT RECOVERY</u>
ARSENIC	<0.010	0.040	0.036	91
LEAD	<0.003	0.020	0.017	83
SELENIUM	<0.005	0.010	0.006	58

ENVIRONMETRICS

WOODWARD-CLYDE CONSULTANTS
2318 MILLPARK DRIVE
MARYLAND HEIGHTS, MO 63043

2345 Millpark Drive
Maryland Heights, MO 63043
(314) 427-0550

ATTN: DAVID PATE

INVOICE # 23221
PROJECT # C3M11Q

QUALITY ASSURANCE QUALITY CONTROL REPORT

DUPLICATE REPORT FORM ICP/AA

SAMPLE ID: WMW-103910GGW
LAB ID: 93091077
PREP CODE: MP-145-35

<u>ELEMENT</u>	<u>SAMPLE RESULT</u>	<u>DUPLICATE RESULTS</u>	<u>PERCENT DIFFERENCE</u>
ANTIMONY	<0.050	<0.050	N/C
BERYLLIUM	<0.005	<0.005	N/C
CADMIUM	<0.005	<0.005	N/C
CHROMIUM	<0.010	<0.010	N/C
COPPER	<0.025	<0.025	N/C
MERCURY	<0.0002	<0.0002	N/C
NICKEL	<0.040	<0.040	N/C
SILVER	<0.010	<0.010	N/C
THALLIUM	<0.050	<0.050	N/C
ZINC	<0.020	<0.020	N/C

ENVIRONMETRICS

WOODWARD-CLYDE CONSULTANTS
2318 MILLPARK DRIVE
MARYLAND HEIGHTS, MO 63043

2345 Millpark Drive
Maryland Heights, MO 63043
(314) 427-0550

ATTN: DAVID PATE

INVOICE # 23221
PROJECT # C3M11Q

QUALITY ASSURANCE QUALITY CONTROL REPORT

MATRIX SPIKE/MATRIX SPIKE DUPLICATE ICP/AA

SAMPLE ID: WMW-103910GGW

LAB ID: 93091077

PREP CODE: MP-145-35

<u>ELEMENT</u>	<u>SAMPLE RESULT</u>	<u>SPIKE LEVEL</u>	<u>SPIKE RESULTS</u>	<u>PERCENT RECOVERY</u>
ANTIMONY	<0.050	1.000	0.678	68
BERYLLIUM	<0.005	0.100	0.094	94
CADMIUM	<0.005	0.100	0.097	97
CHROMIUM	<0.010	0.400	0.393	98
COPPER	<0.025	0.500	0.481	96
MERCURY	<0.0002	0.0020	0.0019	95
NICKEL	<0.040	1.000	0.946	95
SILVER	<0.010	0.100	0.056	56
THALLIUM	<0.050	4.000	3.78	94
ZINC	<0.020	1.000	0.971	97

ENVIRONMETRICS

WOODWARD-CLYDE CONSULTANTS
2318 MILLPARK DRIVE
MARYLAND HEIGHTS, MO 63043

2345 Millpark Drive
Maryland Heights, MO 63043
(314) 427-0550

ATTN: DAVID PATE

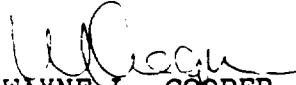
INVOICE # 23221
PROJECT # C3M11Q

ANALYSIS RESULTS

SAMPLE ID: WMW-103910GGWM
LAB ID: 93091078
DATE COLLECTED: 9/17/93

<u>TEST PERFORMED</u>	<u>METHOD OF ANALYSIS</u>	<u>RESULTS</u>
METALS ANALYSIS		<u>TOTAL</u>
ANTIMONY	SW-846 6010	<0.050 mg/l
ARSENIC	SW-846 7060	<0.010
BERYLLIUM	SW-846 6010	<0.005
CADMIUM	SW-846 6010	<0.005
CHROMIUM	SW-846 6010	<0.010
COPPER	SW-846 6010	<0.025
LEAD	SW-846 7421	<0.003
MERCURY	SW-846 7470	<0.0002
NICKEL	SW-846 6010	<0.040
SELENIUM	SW-846 7740	<0.005
SILVER	SW-846 6010	<0.010
THALLIUM	SW-846 6010	<0.050
ZINC	SW-846 6010	0.035

OCTOBER 4, 1993


WAYNE L. COOPER
LABORATORY DIRECTOR

ENVIRONMETRICS

WOODWARD-CLYDE CONSULTANTS
2318 MILLPARK DRIVE
MARYLAND HEIGHTS, MO 63043

2345 Millpark Drive
Maryland Heights, MO 63043
(314) 427-0550

ATTN: DAVID PATE

INVOICE # 23221
PROJECT # C3M11Q

ANALYSIS RESULTS

SAMPLE ID: WMW-103910GGWX
LAB ID: 93091079
DATE COLLECTED: 9/17/93

<u>TEST PERFORMED</u>	<u>METHOD OF ANALYSIS</u>	<u>RESULTS</u>
METALS ANALYSIS		TOTAL
ANTIMONY	SW-846 6010	<0.050 mg/l
ARSENIC	SW-846 7060	<0.010
BERYLLIUM	SW-846 6010	<0.005
CADMIUM	SW-846 6010	<0.005
CHROMIUM	SW-846 6010	<0.010
COPPER	SW-846 6010	<0.025
LEAD	SW-846 7421	<0.003
MERCURY	SW-846 7470	<0.0002
NICKEL	SW-846 6010	<0.040
SELENIUM	SW-846 7740	<0.005
SILVER	SW-846 6010	<0.010
THALLIUM	SW-846 6010	<0.050
ZINC	SW-846 6010	<0.020

OCTOBER 4, 1993

WAYNE L. COOPER
LABORATORY DIRECTOR

ENVIRONMETRICS

WOODWARD-CLYDE CONSULTANTS
2318 MILLPARK DRIVE
MARYLAND HEIGHTS, MO 63043

2345 Millpark Drive
Maryland Heights, MO 63043
(314) 427-0550

ATTN: DAVID PATE

INVOICE # 23221
PROJECT # C3M11Q

ANALYSIS RESULTS

SAMPLE ID: WMW-109920GGW
LAB ID: 93091080
DATE COLLECTED: 9/17/93

<u>TEST PERFORMED</u>	<u>METHOD OF ANALYSIS</u>	<u>RESULTS</u>
METALS ANALYSIS		<u>TOTAL</u>
ANTIMONY	SW-846 6010	<0.050 mg/l
ARSENIC	SW-846 7060	<0.010
BERYLLIUM	SW-846 6010	<0.005
CADMIUM	SW-846 6010	<0.005
CHROMIUM	SW-846 6010	<0.010
COPPER	SW-846 6010	<0.025
LEAD	SW-846 7421	<0.003
MERCURY	SW-846 7470	<0.0002
NICKEL	SW-846 6010	<0.040
SELENIUM	SW-846 7740	<0.005
SILVER	SW-846 6010	<0.010
THALLIUM	SW-846 6010	<0.050
ZINC	SW-846 6010	<0.020

OCTOBER 4, 1993


WAYNE L. COOPER
LABORATORY DIRECTOR

ENVIRONMETRICS

WOODWARD-CLYDE CONSULTANTS
2318 MILLPARK DRIVE
MARYLAND HEIGHTS, MO 63043

2345 Millpark Drive
Maryland Heights, MO 63043
(314) 427-0550

ATTN: DAVID PATE

INVOICE # 23221
PROJECT # C3M11Q

ANALYSIS RESULTS

SAMPLE ID: WMW-10910GGW

LAB ID: 93091081

DATE COLLECTED: 9/17/93

<u>TEST PERFORMED</u>	<u>METHOD OF ANALYSIS</u>	<u>RESULTS</u>
METALS ANALYSIS		TOTAL
ANTIMONY	SW-846 6010	<0.050 mg/l
ARSENIC	SW-846 7060	<0.010
BERYLLIUM	SW-846 6010	<0.005
CADMIUM	SW-846 6010	<0.005
CHROMIUM	SW-846 6010	<0.010
COPPER	SW-846 6010	<0.025
LEAD	SW-846 7421	<0.003
MERCURY	SW-846 7470	<0.0002
NICKEL	SW-846 6010	0.059
SELENIUM	SW-846 7740	<0.005
SILVER	SW-846 6010	<0.010
THALLIUM	SW-846 6010	<0.050
ZINC	SW-846 6010	<0.020

OCTOBER 4, 1993


WAYNE L. COOPER
LABORATORY DIRECTOR

ENVIRONMETRICS

WOODWARD-CLYDE CONSULTANTS
2318 MILLPARK DRIVE
MARYLAND HEIGHTS, MO 63043

2345 Millpark Drive
Maryland Heights, MO 63043
(314) 427-0550

ATTN: DAVID PATE

INVOICE # 23221
PROJECT # C3M11Q

ANALYSIS RESULTS

SAMPLE ID: WMW-108D0GGW
LAB ID: 93091082
DATE COLLECTED: 9/17/93

<u>TEST PERFORMED</u>	<u>METHOD OF ANALYSIS</u>	<u>RESULTS</u>
METALS ANALYSIS		<u>TOTAL</u>
ANTIMONY	SW-846 6010	<0.050 mg/l
ARSENIC	SW-846 7060	<0.010
BERYLLIUM	SW-846 6010	<0.005
CADMIUM	SW-846 6010	4.51
CHROMIUM	SW-846 6010	<0.010
COPPER	SW-846 6010	<0.025
LEAD	SW-846 7421	<0.003
MERCURY	SW-846 7470	<0.0002
NICKEL	SW-846 6010	0.313
SELENIUM	SW-846 7740	<0.005
SILVER	SW-846 6010	<0.010
THALLIUM	SW-846 6010	<0.050
ZINC	SW-846 6010	18.1

OCTOBER 4, 1993


WAYNE L. COOPER
LABORATORY DIRECTOR

ENVIRONMETRICS

WOODWARD-CLYDE CONSULTANTS
2318 MILLPARK DRIVE
MARYLAND HEIGHTS, MO 63043

2345 Millpark Drive
Maryland Heights, MO 63043
(314) 427-0550

ATTN: DAVID PATE

INVOICE # 23221
PROJECT # C3M11Q

ANALYSIS RESULTS

SAMPLE ID: WMW-108D0GGWD
LAB ID: 93091083
DATE COLLECTED: 9/17/93

<u>TEST PERFORMED</u>	<u>METHOD OF ANALYSIS</u>	<u>RESULTS</u>
METALS ANALYSIS		
ANTIMONY	SW-846 6010	<0.050 mg/l
ARSENIC	SW-846 7060	<0.010
BERYLLIUM	SW-846 6010	<0.005
CADMIUM	SW-846 6010	4.42
CHROMIUM	SW-846 6010	<0.010
COPPER	SW-846 6010	<0.025
LEAD	SW-846 7421	<0.003
MERCURY	SW-846 7470	<0.0002
NICKEL	SW-846 6010	0.302
SELENIUM	SW-846 7740	<0.005
SILVER	SW-846 6010	<0.010
THALLIUM	SW-846 6010	0.050
ZINC	SW-846 6010	17.9

OCTOBER 4, 1993


WAYNE L. COOPER
LABORATORY DIRECTOR

ENVIRONMETRICS

WOODWARD-CLYDE CONSULTANTS
2318 MILLPARK DRIVE
MARYLAND HEIGHTS, MO 63043

2345 Millpark Drive
Maryland Heights, MO 63043
(314) 427-0550

ATTN: DAVID PATE

INVOICE # 23221
PROJECT # C3M11Q

ANALYSIS RESULTS

SAMPLE ID: WMW-108S0GGW
LAB ID: 93091084
DATE COLLECTED: 9/17/93

<u>TEST PERFORMED</u>	<u>METHOD OF ANALYSIS</u>	<u>RESULTS</u>
METALS ANALYSIS		TOTAL
ANTIMONY	SW-846 6010	<0.050 mg/l
ARSENIC	SW-846 7060	0.109
BERYLLIUM	SW-846 6010	<0.005
CADMIUM	SW-846 6010	0.475
CHROMIUM	SW-846 6010	0.082
COPPER	SW-846 6010	0.092
LEAD	SW-846 7421	1.02
MERCURY	SW-846 7470	<0.0002
NICKEL	SW-846 6010	0.254
SELENIUM	SW-846 7740	<0.005
SILVER	SW-846 6010	<0.010
THALLIUM	SW-846 6010	0.070
ZINC	SW-846 6010	0.567

OCTOBER 4, 1993


WAYNE L. COOPER
LABORATORY DIRECTOR

ENVIRONMETRICS

WOODWARD-CLYDE CONSULTANTS
2318 MILLPARK DRIVE
MARYLAND HEIGHTS, MO 63043

2345 Millpark Drive
Maryland Heights, MO 63043
(314) 427-0550

ATTN: DAVID PATE

INVOICE # 23221
PROJECT # C3M11Q

ANALYSIS RESULTS

SAMPLE ID: WMW-10110GGW
LAB ID: 93091085
DATE COLLECTED: 9/17/93

<u>TEST PERFORMED</u>	<u>METHOD OF ANALYSIS</u>	<u>RESULTS</u>
METALS ANALYSIS		TOTAL
ANTIMONY	SW-846 6010	<0.050 mg/l
ARSENIC	SW-846 7060	0.181
BERYLLIUM	SW-846 6010	<0.005
CADMIUM	SW-846 6010	0.006
CHROMIUM	SW-846 6010	0.047
COPPER	SW-846 6010	0.063
LEAD	SW-846 7421	0.077
MERCURY	SW-846 7470	<0.0002
NICKEL	SW-846 6010	0.072
SELENIUM	SW-846 7740	0.007
SILVER	SW-846 6010	<0.010
THALLIUM	SW-846 6010	<0.050
ZINC	SW-846 6010	0.199

OCTOBER 4, 1993


WAYNE L. COOPER
LABORATORY DIRECTOR

ENVIRONMETRICS

WOODWARD-CLYDE CONSULTANTS
2318 MILLPARK DRIVE
MARYLAND HEIGHTS, MO 63043

2345 Millpark Drive
Maryland Heights, MO 63043
(314) 427-0550

ATTN: DAVID PATE

INVOICE # 23221
PROJECT # C3M11Q

PREPARATION BLANK

GRAPHITE FURNACE ATOMIC ABSORPTION

PREP. CODE: MP-117-58
PREP DATE: 9/21/93

ELEMENT	BLANK RESULT
ARSENIC	<0.010 mg/l
LEAD	<0.003
SELENIUM	<0.005

ENVIRONMETRICS

WOODWARD-CLYDE CONSULTANTS
2318 MILLPARK DRIVE
MARYLAND HEIGHTS, MO 63043

2345 Millpark Drive
Maryland Heights, MO 63043
(314) 427-0550

ATTN: DAVID PATE

INVOICE # 23221
PROJECT # C3M11Q

LABORATORY CONTROL SAMPLE

GRAPHITE FURNACE ATOMIC ABSORPTION

PREP. CODE: MP-117-58

PREP DATE: 9/21/93

<u>ELEMENT</u>	<u>VALUE</u>	<u>RESULT</u>	<u>PERCENT RECOVERY</u>
ARSENIC	0.050	0.052	104
LEAD	0.020	0.022	109
SELENIUM	0.025	0.024	95

ENVIRONMETRICS

WOODWARD-CLYDE CONSULTANTS
2318 MILLPARK DRIVE
MARYLAND HEIGHTS, MO 63043

2345 Millpark Drive
Maryland Heights, MO 63043
(314) 427-0550

ATTN: DAVID PATE

INVOICE # 23221
PROJECT # C3M11Q

PREPARATION BLANK

ICP/AA

PREP. CODE: MP-145-35
PREP DATE: 9/21/93

<u>ELEMENT</u>	<u>BLANK RESULT</u>
ANTIMONY	<0.050
ARSENIC	<0.200
BERYLLIUM	<0.005
CADMIUM	<0.005
CHROMIUM	<0.010
COPPER	<0.025
LEAD	<0.100
MERCURY	<0.0002
NICKEL	<0.040
SELENIUM	<0.200
SILVER	<0.010
THALLIUM	<0.050
ZINC	<0.020

ENVIRONMETRICS

WOODWARD-CLYDE CONSULTANTS
2318 MILLPARK DRIVE
MARYLAND HEIGHTS, MO 63043

2345 Millpark Drive
Maryland Heights, MO 63043
(314) 427-0550

ATTN: DAVID PATE

INVOICE # 23221
PROJECT # C3M11Q

LABORATORY CONTROL SAMPLE

ICP/AA

PREP. CODE: MP-145-35
PREP DATE: 9/21/93

<u>ELEMENT</u>	<u>VALUE</u>	<u>RESULT</u>	<u>PERCENT RECOVERY</u>
ANTIMONY	0.50	0.464	93
ARSENIC	2.00	1.99	100
BERYLLIUM	0.50	0.486	97
CADMIUM	0.50	0.489	98
CHROMIUM	0.50	0.516	103
COPPER	0.50	0.484	97
LEAD	0.50	0.510	102
MERCURY	0.0020	0.0020	100
NICKEL	0.50	0.496	99
SELENIUM	2.00	1.99	100
SILVER	0.50	0.484	97
THALLIUM	2.00	2.00	100
ZINC	0.50	0.488	98

ENVIRONMETRICS

2345 Millpark Drive
Maryland Heights, MO 63043
(314) 427-0550

C. ODY TRANSFER RECORD/LABATORY WORK REQUEST

Page 1 of 1

COMPANY Woodward-Clyde Cons. CONTACT C. Pavlka PROJECT NO. C-37411Q
 ADDRESS 2318 Mill Park Dr DATE 9-17-93 P.O. NO.
 CITY/STATE/ZIP Maryland Heights MO 63043 DUE DATE — 9-30-93
 PHONE (314) 429-0100 FAX (314) 429-1467

SPECIAL INSTRUCTIONS:

Thermal TAT**ANALYSES REQUESTED**metals
Waste**SAMPLE IDENTIFICATION**

ITEM	LAB NO.	SITE CODE/ SAMPLE DESCRIPTION	DATE COLLECTED	PRESERV.	CONTAINER	ANALYSES REQUESTED	COMMENTS
11	93091077	WMW103910GGW	9-17-93	HN03	Poly 1C	✓	L = 0435
22	93091078	WMW103910GGWM	9-17-93	HN03	Poly 1C	✓	L = 0435 MS
33	93091079	WMW103910GGWX	9-17-93	HN03	Poly 1C	✓	L = 0435 MSD
44	93091080	WMW10920GGW	9-17-93	HN03	Poly 1C	✓	L = 1115
55	93091081	WMW10910GGW	9-17-93	HN03	Poly 1C	✓	L = 1215
66	93091082	WMW108 DOGGW	9-17-93	HN03	Poly 1C	✓	L = 1350
77	93091083	WMW108 DOGGWD	9-17-93	HN03	Poly 1C	✓	L = 1353
88	93091084	WMW108 SOGGW	9-17-93	HN03	Poly 1C	✓	L = 1355
99	93091085	WMW10110GGW	9-17-93	HN03	Poly 1C	✓	L = 1500
10							
11							#(ICP): TC, AG, Ba, Cr, Cu, Ni, Pb, Zn
12							(GFAA): HG, As, Fe
13							SE
14							
15							
16							

* Lab Class A sample
and from M.S. + Days
as attached for Special methods

ITEMS TRANSFERRED	RELINQUISHED BY	Date	Time	RECEIVED BY	Date	Time	REASON for TRANSFER
	Longel Davis	9-17-93	4:51	Jeff Miller	9-17-93	4:44	Tyler
	Clayton Miller	9-17-93	4:51	Jeff Miller	9-17-93	4:44	
	Mike Dotter	9-21-93	3:10	Clay	9-21-93	3:10	Return

METALS/WET CHEMISTRY DATA ASSESSMENT

PROJECT NO. C3M11Q
 LABORATORY Environmetrics
 LAB PROJECT NO. 23222
 NO. OF SAMPLES/
 MATRIX 3/water

SITE NLTSS
 REVIEWER Dana Doerfler
 REVIEWER'S NAME Dana Doerfler
 COMPLETION DATE 10-15-93

DATA ASSESSMENT SUMMARY

	ICP	AA	Hg	CN	OTHER
1. HOLDING TIMES	✓	✓	✓	—	—
2. BLANKS	✓	✓	✓	—	—
3. ses LCS	✓	✓	✓	—	—
4. des Duplicate	✓	✓	✓	—	—
5. DILUTION	NA	NA	NA	—	—
6. OTHER QC MS/MSD	✓	✓	✓	—	—
7. OVERALL ASSESSMENT	0	0	0	—	—

O = Data had no problems/or qualified due to minor problems.

M = Data qualified due to major problems.

Z = Data unacceptable.

X = Problems, but do not affect data.

ACTION ITEMS: _____

COMMENTS: _____

ENVIRONMETRICS

WOODWARD-CLYDE CONSULTANTS
2318 MILLPARK DRIVE
MARYLAND HEIGHTS, MO 63043

2345 Millpark Drive
Maryland Heights, MO 63043
(314) 427-0550

ATTN: DAVID PATE

INVOICE # 23222
PROJECT # C3M11Q, NL TARACORP

ANALYSIS RESULTS

SAMPLE ID: WMW-10210GG00W
LAB ID: 93091155
DATE COLLECTED: 9/20/93 14:35

<u>TEST PERFORMED</u>	<u>METHOD OF ANALYSIS</u>	<u>RESULTS</u>
METALS ANALYSIS		TOTAL
ANTIMONY	SW-846 6010	<0.050 mg/l
ARSENIC	SW-846 7060	0.015
BERYLLIUM	SW-846 6010	<0.005
CADMIUM	SW-846 6010	<0.005
CHROMIUM	SW-846 6010	0.027
COPPER	SW-846 6010	0.028
LEAD	SW-846 7421	0.136
MERCURY	SW-846 7470	<0.0002
NICKEL	SW-846 6010	0.062
SELENIUM	SW-846 7740	0.015
SILVER	SW-846 6010	<0.010
THALLIUM	SW-846 6010	<0.050
ZINC	SW-846 6010	0.123

OCTOBER 4, 1993


WAYNE L. COOPER
LABORATORY DIRECTOR

ENVIRONMETRICS

WOODWARD-CLYDE CONSULTANTS
2318 MILLPARK DRIVE
MARYLAND HEIGHTS, MO 63043

2345 Millpark Drive
Maryland Heights, MO 63043
(314) 427-0550

ATTN: DAVID PATE

INVOICE # 23222
PROJECT # C3M11Q, NL TARACORP

ANALYSIS RESULTS

SAMPLE ID: WMW-104920GG00W
LAB ID: 93091156
DATE COLLECTED: 9/20/93 15:50

<u>TEST PERFORMED</u>	<u>METHOD OF ANALYSIS</u>	<u>RESULTS</u>
METALS ANALYSIS		TOTAL
ANTIMONY	SW-846 6010	<0.050 mg/l
ARSENIC	SW-846 7060	<0.010
BERYLLIUM	SW-846 6010	<0.005
CADMIUM	SW-846 6010	0.005
CHROMIUM	SW-846 6010	<0.010
COPPER	SW-846 6010	<0.025
LEAD	SW-846 7421	0.520
MERCURY	SW-846 7470	<0.0002
NICKEL	SW-846 6010	<0.040
SELENIUM	SW-846 7740	<0.005
SILVER	SW-846 6010	<0.010
THALLIUM	SW-846 6010	<0.050
ZINC	SW-846 6010	0.037

OCTOBER 4, 1993


WAYNE L. COOPER
LABORATORY DIRECTOR

ENVIRONMETRICS

WOODWARD-CLYDE CONSULTANTS
2318 MILLPARK DRIVE
MARYLAND HEIGHTS, MO 63043

2345 Millpark Drive
Maryland Heights, MO 63043
(314) 427-0550

ATTN: DAVID PATE

INVOICE # 23222
PROJECT # C3M11Q, NL TARACORP

ANALYSIS RESULTS

SAMPLE ID: WMW-10410GG00W
LAB ID: 93091157
DATE COLLECTED: 9/20/93 17:00

<u>TEST PERFORMED</u>	<u>METHOD OF ANALYSIS</u>	<u>RESULTS</u>
METALS ANALYSIS		TOTAL
ANTIMONY	SW-846 6010	<0.050 mg/l
ARSENIC	SW-846 7060	0.018
BERYLLIUM	SW-846 6010	<0.005
CADMIUM	SW-846 6010	0.005
CHROMIUM	SW-846 6010	0.035
COPPER	SW-846 6010	<0.025
LEAD	SW-846 7421	0.043
MERCURY	SW-846 7470	<0.0002
NICKEL	SW-846 6010	0.047
SELENIUM	SW-846 7740	<0.005
SILVER	SW-846 6010	<0.010
THALLIUM	SW-846 6010	<0.050
ZINC	SW-846 6010	0.072

OCTOBER 4, 1993


WAYNE L. COOPER
LABORATORY DIRECTOR

ENVIRONMETRICS

WOODWARD-CLYDE CONSULTANTS
2318 MILLPARK DRIVE
MARYLAND HEIGHTS, MO 63043

2345 Millpark Drive
Maryland Heights, MO 63043
(314) 427-0550

ATTN: DAVID PATE

INVOICE # 23222
PROJECT # C3M11Q, NL TARACORP

QUALITY ASSURANCE QUALITY CONTROL REPORT

DUPLICATE REPORT FORM GRAPHITE FURNACE ATOMIC ABSORPTION

SAMPLE ID: WMW-10410GG00W
LAB ID: 93091157
PREP CODE: MP-117-59

<u>ELEMENT</u>	<u>SAMPLE RESULT</u>	<u>DUPLICATE RESULTS</u>	<u>PERCENT DIFFERENCE</u>
ARSENIC	0.018	0.018	0
LEAD	0.043	0.043	0
SELENIUM	<0.005	<0.005	0

ENVIRONMETRICS

WOODWARD-CLYDE CONSULTANTS
2318 MILLPARK DRIVE
MARYLAND HEIGHTS, MO 63043

2345 Millpark Drive
Maryland Heights, MO 63043
(314) 427-0550

ATTN: DAVID PATE

INVOICE # 23222
PROJECT # C3M11Q, NL TARACORP

QUALITY ASSURANCE QUALITY CONTROL REPORT

DUPLICATE REPORT FORM ICP/AA

SAMPLE ID: WMW-10410GG00W
LAB ID: 93091157
PREP CODE: MP-145-37

<u>ELEMENT</u>	<u>SAMPLE RESULT</u>	<u>DUPLICATE RESULTS</u>	<u>PERCENT DIFFERENCE</u>
ANTIMONY	<0.050	<0.050	N/C
BERYLLIUM	<0.005	<0.005	N/C
CADMIUM	0.005	<0.005	N/C
CHROMIUM	0.035	0.029	18.8
COPPER	<0.025	<0.025	N/C
MERCURY	<0.0002	<0.0002	N/C
NICKEL	0.047	0.041	13.6
SILVER	<0.010	<0.010	N/C
THALLIUM	<0.050	<0.050	N/C
ZINC	0.072	0.070	2.8

ENVIRONMETRICS

WOODWARD-CLYDE CONSULTANTS
2318 MILLPARK DRIVE
MARYLAND HEIGHTS, MO 63043

2345 Millpark Drive
Maryland Heights, MO 63043
(314) 427-0550

ATTN: DAVID PATE

INVOICE # 23222
PROJECT # C3M11Q, NL TARACORP

QUALITY ASSURANCE QUALITY CONTROL REPORT

MATRIX SPIKE/MATRIX SPIKE DUPLICATE GRAPHITE FURNACE ATOMIC ABSORPTION

SAMPLE ID: WMW-10410GG00W

LAB ID: 93091157

PREP CODE: MP-117-59

ELEMENT	SAMPLE RESULT	SPIKE LEVEL	SPIKE RESULTS	PERCENT RECOVERY
ARSENIC	0.018	0.040	0.063	112
LEAD	0.043	0.020	0.057	69
SELENIUM	<0.005	0.010	0.0055	55

ENVIRONMETRICS

WOODWARD-CLYDE CONSULTANTS
2318 MILLPARK DRIVE
MARYLAND HEIGHTS, MO 63043

2345 Millpark Drive
Maryland Heights, MO 63043
(314) 427-0550

ATTN: DAVID PATE

INVOICE # 23222
PROJECT # C3M11Q, NL TARACORP

QUALITY ASSURANCE QUALITY CONTROL REPORT

MATRIX SPIKE/MATRIX SPIKE DUPLICATE ICP/AA

SAMPLE ID: WMW-10410GG00W

LAB ID: 93091157

PREP CODE: MP-145-37

<u>ELEMENT</u>	<u>SAMPLE RESULT</u>	<u>SPIKE LEVEL</u>	<u>SPIKE RESULTS</u>	<u>PERCENT RECOVERY</u>
ANTIMONY	<0.050	1.000	0.604	60
BERYLLIUM	<0.005	0.100	0.0967	97
CADMIUM	0.005	0.100	0.0912	86
CHROMIUM	0.035	0.400	0.418	96
COPPER	<0.025	0.500	0.478	96
MERCURY	<0.0002	0.0020	0.0019	95
NICKEL	0.047	1.000	0.973	93
SILVER	<0.010	0.100	0.103	103
THALLIUM	<0.050	4.000	3.75	94
ZINC	0.072	1.000	1.02	95

ENVIRONMETRICS

WOODWARD-CLYDE CONSULTANTS
2318 MILLPARK DRIVE
MARYLAND HEIGHTS, MO 63043

2345 Millpark Drive
Maryland Heights, MO 63043
(314) 427-0550

ATTN: DAVID PATE

INVOICE # 23222
PROJECT # C3M11Q, NL TARACORP

PREPARATION BLANK

GRAPHITE FURNACE ATOMIC ABSORPTION

PREP. CODE: MP-117-59

PREP DATE: 9/23/93

<u>ELEMENT</u>	<u>BLANK RESULT</u>
ARSENIC	<0.010 mg/l
LEAD	<0.003
SELENIUM	<0.005

ENVIRONMETRICS

WOODWARD-CLYDE CONSULTANTS
2318 MILLPARK DRIVE
MARYLAND HEIGHTS, MO 63043

2345 Millpark Drive
Maryland Heights, MO 63043
(314) 427-0550

ATTN: DAVID PATE

INVOICE # 23222
PROJECT # C3M11Q, NL TARACORP

LABORATORY CONTROL SAMPLE

GRAPHITE FURNACE ATOMIC ABSORPTION

PREP. CODE: MP-117-59
PREP DATE: 9/23/93

<u>ELEMENT</u>	<u>VALUE</u>	<u>RESULT</u>	<u>PERCENT RECOVERY</u>
ARSENIC	0.050	0.048	96
LEAD	0.020	0.021	105
SELENIUM	0.025	0.028	112

ENVIRONMETRICS

WOODWARD-CLYDE CONSULTANTS
2318 MILLPARK DRIVE
MARYLAND HEIGHTS, MO 63043

2345 Millpark Drive
Maryland Heights, MO 63043
(314) 427-0550

ATTN: DAVID PATE

INVOICE # 23222
PROJECT # C3M11Q, NL TARACORP

PREPARATION BLANK

ICP/AA

PREP. CODE: MP-145-37
PREP DATE: 9/23/93

<u>ELEMENT</u>	<u>BLANK RESULT</u>
ANTIMONY	<0.050
ARSENIC	<0.200
BERYLLIUM	<0.005
CADMIUM	<0.005
CHROMIUM	<0.010
COPPER	<0.025
LEAD	<0.100
MERCURY	<0.0002
NICKEL	<0.040
SELENIUM	<0.200
SILVER	<0.010
THALLIUM	<0.050
ZINC	<0.020

ENVIRONMETRICS

WOODWARD-CLYDE CONSULTANTS
2318 MILLPARK DRIVE
MARYLAND HEIGHTS, MO 63043

2345 Millpark Drive
Maryland Heights, MO 63043
(314) 427-0550

ATTN: DAVID PATE

INVOICE # 23222
PROJECT # C3M11Q, NL TARACORP

LABORATORY CONTROL SAMPLE

ICP/AA

PREP. CODE: MP-145-37
PREP DATE: 9/23/93

<u>ELEMENT</u>	<u>VALUE</u>	<u>RESULT</u>	<u>PERCENT RECOVERY</u>
ANTIMONY	0.50	0.467	93
ARSENIC	2.00	1.97	99
BERYLLIUM	0.50	0.471	94
CADMIUM	0.50	0.454	91
CHROMIUM	0.50	0.495	99
COPPER	0.50	0.474	95
LEAD	0.50	0.476	95
MERCURY	0.0020	0.0020	100
NICKEL	0.50	0.480	96
SELENIUM	2.00	2.02	101
SILVER	0.50	0.486	97
THALLIUM	2.00	1.93	97
ZINC	0.50	0.480	96

2040 Millpark Drive
Maryland Heights, MO 63043
(314) 427-0550

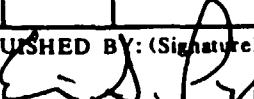
CUSTODY TRANSFER REQUEST/LABORATORY WORK REQUEST

COMPANY Woodland Hills CONTACT David Pote
ADDRESS 2318 N. Main St., Bldg. A DATE 9-30-93
CITY/STATE/ZIP Waukesha, WI 53186 DUE DATE 10-1-93
PHONE (414) 439-0110 FAX (414) 439-0110
IN AROUND TIME/INSTRUCTIONS (No late fees)

SAMPLE IDENTIFICATION

ITEMS TRANSFERRED	RELINQUISHED BY	Date	Time	RECEIVED BY	Date	Time	REASON for TRANSFER	COMMENTS:
3				Ann Finkler	9-21	6:07	Tag in	water
2	Ann Finkler	9-21	5:33	M. Deltson	9-21	7:32	Illegal	
1	M. Deltson	9-23	1:45	Patricia Kelly	9-23	1:45	Return	

WOODWARD-CLYDE CONSULTANTS
2318 MILLPARK DR.
MARYLAND HEIGHTS, MISSOURI 63043
314-429-0100

PROJECT NO:		PROJECT NAME:		NO. OF CONTAINERS	CONTAINER DESCRIPTION / ANALYSES REQUESTED						REMARKS
CBM11Q		NL Taracorp				Nitric Acid & pH 2	1°C	11-214			
SAMPLER'S: (Signature)		Karen Cube									
DATE	TIME	SAMPLE I.D. NUMBER									
9/20	1435	WMW102-1066G00W			1	X					
	1550	WMW10492066G00W					X				
✓	1700	WMW1041066G00W					X				
RELINQUISHED BY: (Signature)		DATE / TIME			RECEIVED BY: (Signature)			DATE / TIME			
		9/20/93 1430						9-21-93 8:37			
RELINQUISHED BY: (Signature)		DATE / TIME			RECEIVED AT LAB BY: (Signature)			DATE / TIME			
METHOD OF SHIPMENT: Drop off @ EnviroMetrics					AIRBILL NO:						

METALS/WET CHEMISTRY DATA ASSESSMENT

PROJECT NO. C3MIIQ-2C
 LABORATORY Environmetrics
 LAB PROJECT NO. 23639
 NO. OF SAMPLES/
 MATRIX 1/water

SITE NL Tinroc Superfund Site
 REVIEWER Gillian Fralick
 REVIEWER'S NAME Gillian Fralick
 COMPLETION DATE 11/15/93

DATA ASSESSMENT SUMMARY

	ICP	AA	Hg	CN	OTHER
1. HOLDING TIMES	—	✓	—	—	—
2. BLANKS	—	✓	—	—	—
3. ^{LCS} SES	—	✓	—	—	—
4. DCS	—	NA	—	—	—
5. DILUTION	—	NA	—	—	—
6. OTHER QC	—	NA	—	—	—
7. OVERALL ASSESSMENT	—	O	—	—	—

O = Data had no problems/or qualified due to minor problems.

M = Data qualified due to major problems.

Z = Data unacceptable.

X = Problems, but do not affect data.

ACTION ITEMS: _____

COMMENTS: _____

ENVIRONMETRICS

WOODWARD-CLYDE CONSULTANTS
2318 MILLPARK DRIVE
MARYLAND HEIGHTS, MO 63043

2345 Millpark Drive
Maryland Heights, MO 63043
(314) 427-0550

ATTN: CYNTHIA PAVELKA

INVOICE # 23639
PO # ---

LABORATORY CONTROL SAMPLE

SAMPLE ID: LCS SAMPLE
LAB ID: LCS VALUES

<u>TEST PERFORMED</u>	<u>LCS STANDARDS</u>	<u>LCS RESULTS</u>	<u>PERCENT RECOVERY</u>
LEAD	0.5 mg/l	0.530 mg/l	106

NOVEMBER 5, 1993

WAYNE L. COOPER
LABORATORY DIRECTOR

ENVIRONMETRICS

WOODWARD-CLYDE CONSULTANTS
2318 MILLPARK DRIVE
MARYLAND HEIGHTS, MO 63043

2345 Millpark Drive
Maryland Heights, MO 63043
(314) 427-0550

ATTN: CYNTHIA PAVELKA

INVOICE # 23639
PO # ---

BLANK RESULTS

SAMPLE ID: BLANK
LAB ID: BLANK VALUES

<u>TEST PERFORMED</u>	<u>METHOD OF ANALYSIS</u>	<u>DATE ANALYZED</u>	<u>RESULTS</u>
LEAD	SW-846 7420	11/02/93	<0.1 mg/l

NOVEMBER 5, 1993

WAYNE L. COOPER
LABORATORY DIRECTOR

ENVIRONMETRICS

WOODWARD-CLYDE CONSULTANTS
2318 MILLPARK DRIVE
MARYLAND HEIGHTS, MO 63043

2345 Millpark Drive
Maryland Heights, MO 63043
(314) 427-0550

ATTN: CYNTHIA PAVELKA

INVOICE # 23639
PO # ---

ANALYSIS RESULTS

SAMPLE ID: WMW104920^{GG CFF}
LAB ID: 93091156
DATE COLLECTED: 9/20/93

<u>TEST PERFORMED</u>	<u>METHOD OF ANALYSIS</u>	<u>RESULTS</u>
METALS ANALYSIS	SW-846 7420	TOTAL
LEAD		0.480 mg/l

NOVEMBER 5, 1993


WAYNE L. COOPER
LABORATORY DIRECTOR

ENVIRONMETRICS
2345 Millpark Drive
Maryland Heights, MO 63043
(314) 427-0650

CUSTODY TRANSFER RECORD/LABORATORY WORK REQUEST

COMPANY Wood Ward Cycle CONTACT Dave Pate
ADDRESS 2318 N. 110th Street DATE 10-29-93
STATE/ZIP Maryland 21206 DUE DATE 11-5-93
ONE () FAX ()
PRINT AROUND TIME/INSTRUCTIONS:

COC # 12109

PROPOSAL #

PROJECT #

PO #

PAGE 1

OF 1

SAMPLE IDENTIFICATION

ITEM	FOR LAB USE ONLY	SITE CODE/ SAMPLE DESCRIPTION	DATE COLLECTED	PRESERV.	CONTAINER	TESTS
1	<u>9/20/93</u>	<u>WMM 10492-066N</u>	<u>9-20-93</u>	<u>HNO3</u>	<u>PL</u>	<u>X</u>
2	<u>9/20/93</u>	<u>WMM 10492-066E</u>				
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						

ITEMS TRANSFERRED	RELINQUISHED BY	Date	Time	RECEIVED BY	Date	Time	REASON for TRANSFER	COMMENTS:
	<u>Chris Whiff</u>	<u>10/29</u>	<u>9:45</u>	<u>Chris Whiff</u>	<u>10/29</u>	<u>9:30</u>		
	<u>Chris Whiff</u>	<u>10/29</u>	<u>9:45</u>	<u>Chris Whiff</u>	<u>10/29</u>	<u>9:45</u>	<u>Initial</u>	
	<u>MDotson</u>	<u>10/29</u>	<u>3:15</u>	<u>MDotson</u>	<u>10/29</u>	<u>3:15</u>	<u>Return</u>	